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TASK FORCE ON INFLATION PROTECTION FOR EMPLOYMENT PENSION PLANS

RESEARCH STUDIES

VOLUME 1

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Superannuation to Indexation: Employment Pensions in the Public and Private Sector in Canada, 1870-1970

Desmond Morton and
Margaret E. McCallum

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Superannuation to Indexation: Employment Pensions in the Public and Private Sector in Canada, 1870-1970

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I INTRODUCTION

If, as some historians have insisted, childhood was an invention of the nineteenth century, retirement as a phase of life may be a creation of the twentieth. Only in this century have the elderly had much hope of security, dignity and independence beyond their working years. Whatever the imperfections of public and private old-age security provisions in Canada, the contrast with the past is impressive.

Neither old age nor pensions are novelties. British military pensioners helped populate Canada. Superannuation, legislated for federal civil servants in 1870, drew on many precedents. The pensions alimentaires described by Allan Greer in his study of Lower Canada's rural society, reveal the prudent anxiety with which one generation gave way to another.[1]

A rural society could absorb most of its elderly and infirm; an urbanized, industrialized, mobile society could not without external institutional intervention. Immigrants, cut off from ancestral ties, migratory workers building Canada's infrastructure, even the clerks, craftsmen and labourers in the cities and factory towns of late-Victorian Canada, could not turn to an extended family when their strength failed. Endlessly enjoined to save for old age, thrift was beyond the means of most. As Herbert Ames discovered when he studied the working-class families of Montreal, even the most frugal budgeting could barely provide for the cyclical crises of seasonal layoff and bad health. Old age was a misery chiefly evaded by early death.[2]

Canada was not a social pioneer. By 1889, Germany had established contributory pension programmes for its lower-paid workers. In 1891, Denmark introduced a means-tested pension. Two years later, Ontario's Charity Aid Act helped transfer the destitute -- including many elderly -- from jails to county houses of refuge. The stigma was only perceptibly smaller and conditions were not much better. 'It has been our experience', Toronto's medical officer of health reported in 1924, 'that a large number of old people will practically starve in preference to entering an institution.'[3]

The doctrine of individual responsibility, buffered by the conviction that the needy and deserving could find charity, allowed respectable Victorian Canadians to reserve most of their social concern for the young. Not only were the elderly destitute the authors of their own thriftless misfortune, there could not be enormous numbers of them when all those over 65 constituted, in 1891, a mere 4.5 per cent of the population.[4] 'As late as the beginning of this century', wrote Hart Clark,

> '... it was generally accepted that those who failed to save enough and were not supported by their families deserved the destitution that was their lot. The thought of levying taxes on the workers in order to provide assistance to others who had failed to provide for themselves was simply unacceptable.'[5]

By the end of that century, Canadians were taxing themselves to support the elderly through nationwide old-age security and pension programmes. In addition, employees in the public and private sector have access to some form of occupational pension or annuity plan. Elderly pensioners and their allies constitute a powerful and effective political bloc, not least because of a cultivated if mildly deceptive image of helplessness.

The historical evolution of social policy in Canada has not attracted systematic or extensive study. Occupational pension plans, the focus of this study, have received only passing references in the few works dealing with old-age security in Canada. While the influence of the Clarks, Laurence Coward, Kenneth Bryden and particularly Adrian Edwards will be apparent to experts in the field, much of this paper represents a pioneering synthesis. More than most history, it depends on a flawed record, with the activities of governments and large employers overshadowing the experiences of innumerable small firms and individual entrepreneurs. The focus is on the evolution of employment pensions, but these arrangements are seen in the context of government programmes for old age security. Beyond governments and major corporations, only accidents of space or personal experience led such journals as Industrial Canada or the Labour Gazette to report on specific arrangements for an annuity scheme or a group insurance plan.[6]

II SUPERANNUATION

Students of labour refer to the 'four fears' of working life: sickness, unemployment, old age and death. Those who could, sought relief in the time-honoured device of mutuality. In Canada, national societies and fraternal orders such as the Orange Lodge, the St. George's Society or the Hibernians existed to help distressed members as much as to sustain ancestral atavism. In succession, immigrant groups created their own ethnic associations. Early unions drew on the mutuality principle to attract members and sustain their loyalty. Canada's oldest surviving local union, the Toronto Typographers, paid benefits to the sick and out-of-work and later, reflecting the influence of its international organization, shared and spread work to protect the interests of older, less agile members.[7]

Mutuality could protect only a minority. The high dues inherent in mutual support were beyond the means of the millions of workers who lived on the edge of hunger and chronic insecurity. For their part, employers were by no means as heartless as strict economic principles deemed them to be. Elderly employees might be kept at work long after their services were worth their wages. Otherwise, an employer might suffer the stigma of casting out an old and faithful servant. Logic linked to charity dictated the next step: a small ex gratia pension or annuity. The initiative and the amount depended entirely on the employer's bounty.[8]

The occupational pension plan best known to nineteenth-century Canadians was not Canadian at all. Britain's counterpart to Louis XIV's foundation for old soldiers, Les Invalides, were the Royal Hospital, Chelsea and the Naval Hospital at Greenwich. From 1681, a half-pence a week was deducted from a British soldier's meagre pay in return for the promise that when disabled or 'decayed', he would find lodging for the rest of his days or, more commonly, an out-pension of 6d a day. Because younger soldiers deserted in droves to seek their fortune in the nearby United States, much of Britain's garrison in Canada eventually consisted of units composed of old soldiers and pensioners, such as the Royal Canadian Rifles. Such men would endure the privations and discipline of military life in return for a secure old age.[9]

Managers of large private undertakings could readily see the application. Railways, preoccupied with the task of imposing discipline and dependability on armies of employees in a far-flung enterprise, turned almost instinctively to military solutions -- uniforms, strict hierarchies, voluminous regulations. Pensions were an obvious additional application of a military model. In 1874, the Grand Trunk established a compulsory superannuation and provident fund for its clerical and indoor staff; employees contributed $2^1/_2$ per cent of their salary and the company matched the contribution. Benefits were based on a sixtieth of the employee's regular pay at retirement multiplied by the number of years of contribution to the plan.[10] Locomotive engineers, the aristocrats of the running trades, already enjoyed life insurance and death benefits from their international brotherhood. Other running trade brotherhoods followed it.[11]

The best documented of Canada's early occupational pension plans took as its title 'An Act for better increasing the efficiency of the Civil Service of Canada'. The Superannuation Act of 1870 had a further motive: easing the departure of venerable officials inherited from the United Provinces and allowing the young Dominion government to make fresh appointments, particularly from the lower provinces. The Minister of Finance, Sir Francis Hincks, was characteristically blunt: the legislation was 'not for the benefit of employees, but for the protection and benefit of the public and to enable the Government to get rid of persons who had arrived at a time of life when they could no longer perform their work efficiently.'[12] Civil servants offered superannuation would have no alternative but to retire.

Such firmness may have allayed some opposition from suspicious politicians and voters. It also shaded the fact that, even by modern standards, the

1870 Act was generous. Benefits could be paid at age 60 after ten years service. Allowances were to be based on a percentage of the average salary for the last three years of service ranging from 20 per cent after ten years to a maximum of 70 per cent for 35 years. Employees would contribute 4 per cent of their salaries if they earned $600 or more or $2^1/_2$ per cent if they earned less. Employees forced by physical or mental disability to retire before they were eligible for superannuation could claim a month's pay for each year of service. Employees disabled in the line of duty could be compensated by a more generous gratuity. Anyone removed from office 'in consequence of the abolition thereof, in order to the improvement (sic) of the department of which he belongs, or otherwise to promote effciency or economy in the Civil Service' could have an additional ten years imputed to his term of service.[13]

While the government plan was financed, at least initially, from the Consolidated Revenue Fund, many of its provisions were borrowed from the pension fund society established under special statute in 1860 for employees of the Bank of Montreal.[14] Such schemes were sufficiently interesting that in 1887, without debate, Parliament passed a Pension Fund Societies Act. The legislation stipulated that officers of the employing corporation were to be the incorporators of the society and that all contributors to the fund were entitled to vote at the society's general meeting, subject to the society by-laws. All revenues were to be devoted exclusively to the maintenance of the society and the payment of pensions.[15]

Contributory pensions, whether for public or private employees, could be justified as due recompense for providence and thrift. Scattered examples of non-contributory pensions also survive. Under the Supreme Court and Exchequer Court Act of 1875, judges who acquired a permanent disability after fifteen years on the bench could retire with two-thirds of their salary. By 1904, judges could retire on full salary at 75 after 20 years service, at 70 after 25 years or at any age after 30 years.[16] The Canadian Pacific Railway's superannuation arrangements, announced in 1903, were also fully paid for and managed by the employer so that employees might 'build up ... a feeling of permanency in their employment, an enlarged interest in the company's welfare, and a desire to remain in and to devote their best efforts and attention to the company's service.' Employees with ten years' service were eligible for a pension at 65 based on one per cent of average earnings in the previous ten years multiplied by the number of years of service.[17]

Employers had a further motive for retaining full control and financial responsibility for pension plans. In proclaiming its plan, the CPR emphasized that the company's action was entirely voluntary, that employees derived no rights from its creation and that they could be discharged without pension or have their pensions cancelled for gross misconduct.[18] In 1908, the CPR wiped out the pension rights of employees who had struck the company and in 1910, in the course of a bitter strike, the Grand Trunk did the same. While regretting that individual workers might suffer, the Financial Post endorsed the railway management's action. Pension plans, after all, were 'designed in part as a preventative of strikes'.[19] In 1923, when the Grand Trunk had become part of the government-owned Canadian National, the pension rights of the 1910 strikers were restored.[20]

III ANNUITIES

Until the 1920s, only a small minority of employers, public or private, took a systematic interest in their employees' post-retirement incomes. Old age remained an individual or family problem. The majority report of the Royal Commission on the Relations of Labor and Capital in 1889 urged Parliament to establish an annuity system 'under which working people and others might make provision for old age by periodical or occasional payment of small sums'. Such a system, based on experience in France, 'would remove from many the fear of dependence upon relatives or upon charity in their declining years, and it could be managed without expense to the Government.'[21] Annuities were ignored in the more radical minority report. They suffered the same treatment from the government.

What stirred parliament to action a generation later were the efforts by Britain's new Liberal government to introduce a national non-contributory pension plan. The prime minister, Sir Wilfrid Laurier, was unmoved. 'To ask purely and simply that there should be an old age penion whether a man has been thrifty or the reverse, whether he has been sober or not, whether he has been a good citizen or a bad citizen, is going further than I would be disposed to go', he told the 1907 Parliamentary session.[22] Fellow Liberals were more open to British example. The compromise was to return to the recommendation of 1889. The Government Annuities Act of 1908, 'to the end that habits of thrift be promoted', authorized the sale to any Canadian resident of an immediate or deferred annuity paying from $50 to $600 a year. A small wage earner who contributed 25 cents per week for 40 years could expect an annuity of $129.91 a year at age 60.[23] Employers could purchase annuities for individually named employees. The Annuities Act, boasted William Fielding, Laurier's finance minister, would eliminate the need for any government programme of old-age pensions.[24]

Despite the claim and a measure of subsidy -- the government offered 4 per cent interest at a time when bonds yielded 3³/₄ per cent -- there was no great market for the new annuities. In 1927, the government reported only nine thousand contracts. In that year, Canada's first old-age pensions, means-tested, minimal and jointly funded by the provinces, passed into law.[25]

IV GROUP LIFE

Business historians frequently note the surge of professional management and expertise in Canadian companies in the first decades of the twentieth century. New ideas about industrial efficiency, cost-accounting and personnel management spread north from the United States. So did unions and ideas about how to combat them. Bonus and profit-sharing schemes were an obvious way for companies to retain employee allegiance. Such schemes easily incorporated provision for welfare and superannuation benefits. Clayton & Sons, a large Halifax clothing manufacturer, inaugurated Christmas bonuses in 1899 as a way of distributing part of the company's profits. A pension and disability fund formed part of the company plan. In other companies, the new American style of business efficiency doomed good-natured paternalism. Pensions must have a purpose.[26]

The new century and particularly the period of the Great War saw a growing enthusiasm for efficient and systematic techniques in business management. The casual old practice of pensioning off faithful employees was an obvious target for reformers. American business methods were a corollary of the dramatic expansion of foreign investment during the Laurier-era prosperity.

The Great War, 1914-19 imposed enormous economic and social costs on Canada. It also engendered the faith that out of so much suffering must come a better society. Scores of reforming ideas vied for adoption in a 'reconstructed Canada, not least the need for a new relationship between the old antagonists of capital and labour. To underline the need, never had the old antagonists battled more fiercely than in 1919, the worst year for strikes in Canadian history. A Royal Commission, appointed to dissect and cure the industrial relations crisis, concluded that Canada needed 'a system of State Social Insurance for those ... unable to work, whether the inability arises from lack of opportunity, sickness, invalidity or old age.'[27]

Such a recommendation posed a disturbing challenge to politicians and business leaders, eager on the whole to restore an interventionist wartime government to its normal peacetime passivity.[28] In the United States, group life policies had emerged before the war as an attractive instrument for marketing pensions and retirement benefits. In 1910, the merchandising firm of Montgomery Ward had explored such arrangements for its employees. In 1912 the first such policy was written by the Equitable Life Assurance Co.[29] In Canada, normally a fertile field for the insurance industry, the federal government's regulatory agency, the Department of Insurance, had resisted the concept on the technical argument that insurance applicants were to be treated equitably and the absence of a medical examination inherent in a group life policy would lead to inequity. In the circumstances of 1919, such objections could be overcome by the insurance committee of the Canadian Manufacturers' Association. Citing American experience, the CMA committee claimed 'group life insurance ... has the effect of doing away with a great many labour troubles, discouraging strikes and generally improving the morale of employees.'[30]

Within four months of being legitimised in November, 1919, more than forty Canadian employers had organized group life policies for their employees, most of them on a non-contributory basis. In 1923, the Sun Life pioneered group anuities, in a contract it signed with the Herald Publishing Co. of Calgary on behalf of its hundred employees. Payments were based on years of service. Any employee permanently disabled by sickness or injury could claim a benefit before the age of 60.[31] Pioneering could be lonely; the Sun Life's next contract was signed in 1928. Group life plans proved more popular. In 1926, sponsors formed a national association. As a product, group life policies had some of the features of commercial wholesaling: employers kept the records and collected the premiums. In turn, they expected to share in the savings.

The 1920s saw a long list of prominent corporations and public employers enter the pension field, from the farm machinery firm of Massey Harris to the government of Manitoba. If banks and railways had long since led the way, department stores, utilities, and occasional manufacturers joined the list.[32] As an Imperial Oil official explained to the Royal Commission in 1919, corporate welfare 'is not philanthropy and it is not benevolence: it is a cold-blooded business proposition'.[33] Pensions were not deferred wages, insisted the superintendent of industrial relations for the Cape Breton-based corporate giant, BESCO, they were a legitimate management device to inspire loyalty and co-operation from employees, to raise morale and efficiency, cut labour turnover and to make it easier to dispose of older, less efficient workers.[34] Considering the Cape Breton-based firm's record of long, violent strikes during the 1920's, it could certainly use all the loyalty, efficiency and co-operation it could muster.[35]

More successful in its labour relations was the Imperial Oil Co. the Sarnia firm was a showplace of enlightened labour policies in the 1920s with its industrial council, employee welfare fund and conspicuous lack of unions. Imperial's pension policy, like most of its kind, was non-contributory, with retirees collecting two per cent of their average salary over the previous ten years for each year worked to a maximum of 37$^1/_2$ years.[36] The plan, insisted the company, was 'purely a policy of business administration to promote continuity of effort and permanence of employment.'[37] Shareholders and outsiders obviously had to be reassured that the company had not gone soft. A more typical plan, reported by the Labour Gazette, was created in 1920 for employees of a St. Catharines manufacturing company, Whitman and Barnes. Eligibility varied with sex, age and service, with women qualifying five years earlier than men for a pension based on one per cent of the average salary for the previous ten years multiplied by the number of years worked. The rules, warned the company, might be changed at any time, but not for those already pensioned.[38]

Profit-sharing continued to be entwined with some pension plans. The Robert Simpson Co. of Toronto invited employees in 1919 to deposit five per cent of their salary annually, up to a maximum of $100 (a limit imposed, the company explained, so that better-paid employees could not benefit disproportionately). The company deposited five per cent of its annual earnings the final for the benefit of participating employees and it was invested. At the end of ten years, an employee could withdraw his deposit with interest and a share of any profit. So could women who left after five years to get married. So the could the dependants of deceased employees. Other employees who left prematurely were entitled to no more than their deposits and five per cent interest.[39] Christie Brown & Co., a Montreal-based biscuit manufacturer, introduced a similar scheme in 1926. Three company officers and two employees formed the board of trustees, 'their decision to be considered unanimous on a majority vote'.[40]

Such an arrangement underlined who held power in company-sponsored schemes. These soon extended from pensions and profit sharing to stock-purchase plans. In the grim aftermath of the 1929 crash, the board administering Ontario's new Security Frauds Prevention Act decreed that employee payments into any stock-sharing subscription plan would have to be held in trust for the employees.[41] Provinces were edging closer to regulating a sphere of activity that lay plainly within their constitutional ambit. Doing so depended on facts. In 1929, Ontario's Department of Labour cautiously surveyed the industrial welfare plans of three hundred firms, including most of the province's largest employers. Of the sample, 61 provided some form of pension, normally on a non-contributory basis.[42] The same pattern was apparent in a survey of the pension plans reported by the Labour Gazette. [See Appendix A Table 1.] By the end of the 1920s, a total of 707 employer-run pension plans were reported to be in operation; 369 of them had been instituted between 1920 and 1929.[43]

V PUBLIC-SECTOR PENSIONS

As employers, provinces and municipalities had followed the tendency of the times; a few had even anticipated them. By the end of 1922, Ontario, Quebec, British Columbia and Alberta had all instituted pension plans for provincial government employees. In contrast to private employers, government plans were invariably contributory. British Columbia's Superannuation Act, while designed for provincial, municipal and school board employees, invited private sector employers and employees to join the plan. The cost to employees was four per cent of earnings, matched by their employers. Few firms were tempted. Nova Scotia, hard pressed by a collapsing economy, passed its Public Service Superannuation Act in 1924 but failed to proclaim it until 1934.[44]

The provinces often lagged behind municipalities and school boards. Halifax's superannuation fund was established in 1906. Benefits, payable at age 65, were based on one per cent of the average salary over an employee's entire service multiplied by the number of years worked. Compulsory pension contributions, based on four per cent of annual earnings, might be returned without interest if an employee lost his job. If he left of his own volition, half the contributions were forfeited.[45]

Like most municipalities, Halifax excluded police and firefighters, presumably because they had their own mutual benefit and pension society.[46] Hamilton's police benefit fund, launched in 1893, required each member to contribute seven per cent of his salary. Withdrawals from the fund were approved by a vote of all contributing officers. Hamilton firefighters created their pension fund in 1910, based on contributions deducted from a wage increase and a $500 grant from the city council. Other grants followed from time to time.[47] Toronto firefighters contributed from seven to nine per cent of their salaries to a Firemen's Superannuation and Pension Fund; the city granted $27,300 a year. Toronto police ran their own benevolent fund, contributing seven per cent of their salaries.[48]

Among western cities, Winnipeg established a pension plan for its employees in 1921, with contributions ranging from three to five per cent of salary depending on length of service. The city matched the contributions.[49] British Columbia amended its Superannuation Act in 1923 to allow municipalities to create their own pension funds, with matching employee contributions based on four per cent of salary. By 1928, twelve municipalities had established such funds.[50] Ontario and Saskatchewan waited until 1937 to legislate in the municipal pension field and then took divergent directions. While Saskatchewan opted for a separate fund for each municipality, Ontario laid the foundation for the Ontario

Municipal Employees' Retirement Scheme or OMERS by centralizing the management of contributory funds.[51]

Among public employees, teachers were among the earliest beneficiaries of provincial pension policy. In 1880, Quebec led the way by voting a thousand dollars to a fund to be created chiefly by lay teachers contributing two per cent of their meagre salaries. After forty years' service, at age 58, a teacher could retire on the average of his or her career earnings.[50] Nova Scotia amended its Education Act in 1906 to allow an annuity of up to $150 for teachers who had survived 35 years in a public school or who had accumulated 30 years of service at age 60.[51] In 1910, New Brunswick provided teachers' pensions to men at 60 and women at 55, in both cases after 35 years of service. The pensions were based on half the average salary of the previous five years. In 1922, the province repented its generosity and compelled teachers to contribute to their pensions.[52]

By 1930, most provinces had some form of teacher superannuation. Alberta discussed the matter in 1929 and then delayed action until 1939.[53] British Columbia's 1930 legislation was unique. Teachers had to contribute four per cent of their salaries but they could give more if they chose. Contributions were kept in separate accounts at five per cent interest and at retirement a teacher was entitled to double the annuity that could be purchased from his or her account.[54]

A special form of public pension which preoccupied Parliament and many Canadians was the system of payments to the disabled survivors of the wartime Canadian Expeditionary Force, their dependants and the widows and children of men who did not come back. Official policy for soldiers' re-establishment emphasized the urgent need to restore veterans, able-bodied and otherwise, to the workforce. To equalize the opportunities of the disabled, Ottawa devised a system of Returned Soldiers' Insurance, available without a medical examination, and subsidised premiums demanded by Workmen's Compensation Boards. In 1930 Ottawa finally acknowledged the plight of a core of unemployable veterans -- so-called 'burnt-out' cases -- and established War Veterans' Allowances for returned men (and a few women) too young to qualify for the Old Age Pensions approved by Parliament in 1927.[55]

Veterans' pensions had little bearing on the evolution of occupational superannuation but constant debate about pensions and the emergence in 1927 of a Department of Pensions and National Health laid a foundation for federal involvement in social security issues. Politicians and officials learned the complexities and sensitivities involved in social policy. Veterans and their organizations became a vanguard for the entire interest group of the elderly.[56]

VI THE GREAT DEPRESSION

For some Canadians, the Depression of the 1930s began in 1928; for many more it endured until the outbreak of the Second World War. For urban and industrial Canada, it reached its nadir in 1932, with a quarter of the workforce unemployed and a sixth of the population on relief. Recovery followed slowly, its effects concealed by continuing massive unemployment.[57]

An early casualty of the Depression was the corporate welfarism of the 1920s. Even if employers had had profits to share or spare capital to fund pensions, they had no need to discourage employee turnover or labour agitation. All the security most workers wanted was a job. Many employers converted pension plans to a contributory basis.[58] Charles E. Frosst & Co., a Montreal pharmaceutical manufacturer, introduced a pension scheme in 1932 to be jointly financed by employer and employee.[59] In the same year, Imperial Oil halved its pension benefit to one per cent of salary per year of service. Employees could restore their original pensions by contributions ranging from 3$^1/_2$% to 5 per cent of salary depending on when they began to contribute. Employees who left the plan or the company could reclaim their contributions plus three per cent interest.[60] A pension plan introduced in 1938 by the Campbell Soup Co. required employee contributions of four per cent of wages. The plan was limited to employees earning less than $250 a month.[61]

The Depression years brought a revival of interest in government annuities. The decade coincided with a bulge in the number of aged and the times bred insecurity. Some people noticed that an outdated mortality table and four per cent interest made the government plan a very good investment. To insurance companies, scrambling for business in tough times, the government programme seemed like unfair competition. Charges of mismanagement, a costly sales force and 'an undetermined but awesome liability' were orchestrated into a campaign to abolish or severely limit the annuity system. The Chamber of Commerce, the financial press, senators connected to the insurance industry and even the government's own Department of Insurance backed the attack.[62]

Meanwhile, annuity sales doubled from 1930 to 1934 and quadrupled by 1935. Despite the findings of a 1936 Senate committee which painted a picture of impending financial disaster, Norman Rogers, the Minister of Labour in the restored Liberal government, maintained the 4 per cent interest rate and adopted a slightly altered mortality table.[63] In 1938, the government announced that group annuities would be available to companies seeking pension arrangements for their employees. There were relatively few takers. As H.D. Clark later pointed out, government annuities met the needs of employees, not employers. What was the point of offering a benefit which by the 1940s, with a twenty-year vesting rule, might be as valuable to a worker if he quit as if he stayed on?[64]

Annuities, life policies and pension plans, contributory or otherwise, provided security in old age to no more than a minority of Canadians at the end of the 1930s. A 1937 study for the National Commission on Employment found that fewer than eight per cent of Canadian businesses had a pension plan.[65] A survey by the Industrial Relations section of the Queen's University School of Commerce and Administration estimated in 1938 that 70 per cent of Canadians had no old age income protection whatever.[66] For them, retirement or unemployment would still lead to privation, humiliation and dependence.

VII TAX SHELTERS

The outbreak of war in 1939 found one Canadian in six looking for work. Two years later, the national unemployment rate approached zero. In the West, a decade of ecological disaster ended and farmers began harvesting a series of bumper crops. The war years were good to a lot of Canadians. With money to spend for the first time in years, consumers threatened to add inflation to the other strains on a war-time economy. One response was to grant sweeping powers to a War-time Prices and Trade Board and to the National War Labour Board to hold down prices and wages. Other policies diverted income and profits into taxes, the new Unemployment Insurance programme and into retirement savings.

With the Social Security Act in effect in the United States since 1935, Canada had a powerful example to justify a national contributory old-age pension plan. Just such a plan was urged in Leonard Marsh's historic report on social security for Canada, presented in 1943. In addition to the obvious need, Marsh insisted that such a plan would foster thrift and could certainly co-exist with private pension plans, as Social Security had in the United States.[67] Unlike other features of the Marsh report, including family allowances and health and hospital insurance, a national retirement plan received little consideration in the 1940s. One good reason was that employers suddenly seemed to be filling the need. In turn, that was because of a half-forgotten feature of public policy.

In the 1914-18 war, Ottawa had nervously introduced a tax on profits and then, in 1917, a temporary 'Income War Tax' as the mildest possible conscription of wealth. As any cynic could have predicted, the income tax easily survived the war. In turn, more and more complex questions about the definition of income had to be answered. Should pensions be considered income? If so, was it fair to tax contributions set aside to earn a pension? In 1919, the Income Tax Act was amended to indicate that such contributions would not be taxed. What about income earned on funds managed by pension trustees and intended to enhance pensions? In 1928, trustees were allowed to choose whether they wanted funds exempted from taxation. If they so elected -- and most, understandably did -- employee contributions would no longer be tax deductible, though pensions would be when received. In 1936, employers were limited to $300 per employee per year in tax-deductible pension contributions -- up to a maximum of five per cent of payroll.[68]

Such rules were complicated and, until the Second World War, not very important. Tax rates were low and the burden was too light to encourage strenuous avoidance. In 1938, Canadian corporations contributed only $85 million in federal taxes. The war changed the burden out of recognition. By 1943, income and excess profit taxes cost corporations $740 million. In the same period personal income taxes rose almost fifteen-fold, from $47 million to

$698 million.[69] Even discounting full employment and soaring economic activity, taxes had become a burden worth shifting. There were other good reasons to create a company pension plan. With labour in short supply and real wages frozen as close to 1929 levels as the National War Labour Board could manage, employers looked to 'fringe benefits' such as a pension to attract and hold workers.[70]

Provided intentions were honest, Ottawa approved. In 1942, the Minister of National Revenue assumed the power to approve pension plans for eligibility for tax deduction. A statement from a qualified actuary was required as a guarantee that payments really were needed to keep a pension fund sound.[71] After 1945, the regulatory role of National Revenue was not easily abandoned. Instead, Ottawa proceeded to implement a lot of the advice it received from the Ives Commission on the Taxation of Annuities and Family Corporations. Trust companies were liberated from some of the disabilities they had suffered in the pension field since 1928. To stay competitive, insurance companies were obliged to design plans with a variety of funding options. Deposit administration was one plan, first offered in 1950.[72]

One traditional public competitor was quietly but systematically eliminated in the postwar years. Government annuities had thrived and expanded during war and depression, serving small employers and middle class professionals and defying overt assault by major financial interests. More discreet tactics, directed at a weak Minister of Labour and a government eager to conciliate investors suceeded where frontal attack had failed. In 1948, the interest on Government annuities was cut from 4 to 3 per cent, mortality tables were brought in line with those used by insurance companies, efforts to raise the benefit ceiling of $1200 were stymied for years. In the 1960s, when both the Glassco and Porter Commissions declared that Government annuities had lost their value as promoters of thrift and retirement security, few disagreed. By 1967, Canada's first serious attempt at old age security was quietly wound down.[73]

VIII UNION BENEFITS

The war years helped determine that Canada's occupational pension system would be built on a patchwork of private plans, administered by trustees chosen by the employer or by trust and insurance companies and regulated, almost accidentally, by federal tax collectors. The war years also saw a dramatic growth in unionization and the institutionalization of collective bargaining under the National War Labour Order (PC 1003) of February 1944. A series of successful postwar strikes in 1945-6 and passage of the Industrial Relations and Disputes Investigation Act (IRDIA) of 1948, as well as analogous provincial statutes, confirmed that unions would have an enduring role in negotiating wages, benefits and working conditions.[74]

Were pensions subject to bargaining? An American case, Inland Steel v. National Labor Relations Board, determined in 1948 that in the United States pensions were part of wages and therefore subject to negotiation.[75] CIO unions in the U.S. promptly launched a drive for non-contributory pensions to make up for inflationary inroads on the value of Social Security payments. A CIO affiliate, Local 200, UAW, made its case in 1950 to the Ford Motor Co. of Canada for a non-contributory pension of $100 a month at age 65 after 30 years of service. The company offered a $55 pension on the same terms. Across the border, an Ontario conciliation board was informed, Ford had agreed to a pension plan that paid the difference between Social Security benefits and $100 a month. The board chairman, C.P. McTague, and the company nominee jointly regretted that the company had ever conceded a non-contributory, jointly-administered plan but they recommended the employer's proposal with minor changes. The union nominee protested that even $100 a month, 44 per cent of the average autoworker's wage, was too meagre for 1950. The union settled for the company offer -- and the principle that it could come back later for more. The agreement became the pattern for a pension plan that the UAW negotiated later that year with General Motors of Canada.[76]

In the postwar period, unions became the norm in most major Canadian industries. Companies that wished to remain non-union imitated union gains in their own pay and benefit policies. In 1946, a quarter of industrial workers had had some pension protection; by 1951, the percentage was 45. A sample of pension plans presented by the Labour Gazette in 1950 suggested little change from the 1920s. Contributory plans predominated. In return for 3 to 4 per cent of income, they offered 1 to $1^1/_2$ per cent of annual earnings for each year worked. Most plans depended on regulated benefits; others regulated contributions, building individual accounts to buy annuities on retirement. While a growing number of plans included some benefits for pre-retirement death or disability, most guaranteed no more than a return of contributions while some offered nothing. Very few plans included survivor benefits for a pensioner's widow.[77]

Unionization did, however, change basic assumptions about pensions. In the 1920s, corporate welfare plans had been management's business; the 1950 Ford negotiation established that they were part of the collective bargaining process. Pensions were no longer rewards to faithful employees; unions insisted they were an integral part of the compensation package. In turn, public opinion added pensions to the demands that unions might legitimately make on employers. Gallup polls in the 1950s indicated that as many as one Canadian in six regarded pension plans as among the most important labour issues, ranking behind job security and improved working conditions. Even among unionists, opinion strongly favoured contributory over non-contributory plans. In their own way, workers wanted to know that they, not the employer, had created the plan. Unions made their own pragmatic compromises with the pension issue. In 1952, organized labour helped persuade National Revenue to accept 'terminal funding', a means of sparing employers from anteing up regular contributions, provided they came good when an employee retired. The pension industry might deplore a 'crude device' which denied trust and insurance companies money to invest but union negotiators recognized employers would be more ready to agree to pensions if their own capital was not tied up needlessly.[78]

Funding was a problem even pension planners could recognize. Writing in 1956 as an established expert on pensions and benefits, William Mercer warned that there were 'cons' as well as 'pros' in establishing an 'approved' plan. Certainly there could be good will from employees and an easier opportunity to remove aged and unproductive workers but 'if a pension plan is funded in an orthodox fashion the employer builds up a larger fund by irrevocable contributions and these funds belong to his employees as a group'.[79] Management was losing control. Significantly, while the number of plans grew dramatically in the 1950s, coverage of the workforce on a porportionate basis hardly grew. Perhaps, Mercer claimed, a young and vibrant country should have less emphasis on 'security'.

IX OLD AGE SECURITY

As the 1950 dispute between Ford of Canada and its UAW local had illustrated, the existence of Social Security in the United States affected occupational plans on both sides of the border.

Since 1927 Canada had, of course, made provision for non-contributory means-tested old-age pensions, jointly financed by Ottawa and the provinces. Organized labour took pride in the pressure it had exerted to achieve an undoubted reform and it kept up the pressure until, in 1937, the last holdouts, Nova Scotia and New Brunswick, joined the scheme.[80] However, few people in an affluent postwar Canada could believe that poverty among the elderly was abolished by a pension of $40 a month (in 1949), limited to Canadians aged 70 or over, with twenty unbroken years of residence, who were willing to submit to a probing examination of their means. By 1951, 302,173 citizens, almost half the cohort of Canadians over 70, had qualified under these terms.[81] A nation whose disposable income had almost doubled in the five years since the war was susceptible to the argument that it could afford a better living for its newly-titled 'senior citizens'. Even so conservative a guardian of provincial rights as Maurice Duplessis was willing to make an exception for federal aid to the Quebec's elderly.[82]

The Old Age Security Act of 1951 made the $40 pension automatic at 70 for people who met the residence qualification. An accompanying Old Age Assistance Act undertook that Ottawa would meet half the cost of a means-tested pension of $40 for those between 65 and 60.[84] Both programmes contributed to Liberal success in the 1953 federal election and the government undoubtedly expected to renew its popularity with a $6 increase to the basic $40 pension in 1957. Instead they were attacked as 'the six buck boys' by a successful Conservative opposition which, once in power, added a further $9 to the monthly payments. In turn, the gesture contributed to the Diefenbaker electoral landslide of 1958.[85]

One of the major accomplishments of the Diefenbaker government was a series of searching enquiries into a variety of policy fields, from tax reform to the delivery of health services. Dr. Robert M. Clark of the University of Toronto tackled the problems of old-age security. His study, a comparison of Canadian and American experience, spelled out for many people why Canada needed a universal, contributory income maintenance scheme like Social Security. Clark's two-volume report also put a factual foundation under a need dramatised by the late 1950s recession: pension portability.[86]

'Portability' seemed a logical reform when fifteen years of steady prosperity suddenly dissolved into a recession and jobs vanished in layoffs and plant shutdowns. In contrast to their parents, a lot of Canadian workers in 1959 or 1960 expected to have a pension on retirement. They now discovered how easily pensions could vanish with the job.[87] Some employers were accused of deliberately shifting or closing operations to escape a pension liability. Even when workers kept their jobs or their pension rights, labour mobility was inhibited. Should workers abandon hard-earned pension credits to start again elsewhere? Though Clark had specifically warned against such a scheme, debate on his report helped ensure that both the Liberals and the newly-founded New Democrats added a national portable pension programme to their party platforms.[88]

So did the Progressive Conservative government. Clark's report inspired extensive staff work in the Department of National Health and Welfare. Many Conservatives, since R.B. Bennett, had favoured both the moral principle and the economy of contributory pension plans, even as a substitute for Old Age Security. Private initiative, they also felt must be preserved: 'To the extent that existing private plans are considered to be satisfactory', the Hon. J.W. Monteith assured business leaders in the summer of 1962, '... persons covered under these plans will be exempt from the compulsory feature of the new program.'[89] In fact, the Diefenbaker government had little sense of urgency about pension reform. For once, the prime minister accepted civil service advice. A contributory pension, warned R. B. Bryce, the Clerk of the Privy

Council, would be 'pie in a rather distant sky as far as the man in the street was concerned.'[90]

It was also apparent that any federal plan would involve painful negotiation with the provinces, in whose constitutional ambit pension policy plainly belonged. Strongly urged by the Ives Commission of 1945, Ottawa had gone far beyond the pension regulations that might be justified by its taxing power. Ives had encouraged the 20-year vesting rule and had recommended (though in vain) that the $300 ceiling on tax-deductible pension contributions be removed. It was raised instead to $900 and later, in 1958, to $1500. Bulletins and Information Circulars from the federal Department of National Revenue set policy for the private pension industry. Annual versions of the Income Tax Act changed the rules, helping trust companies and then the insurance industry to expand their pension offerings. Barriers on investing in equities were eased in 1956. Plans were no longer 'approved' but registered: Ottawa had no wish to endorse any commercial product but it certainly wanted to encourage saving. That was the effect, in 1957, when it introduced a tax exemption for Registered Retirement Savings Plans, an ideal devices for the self-employed and unpensioned.[91]

Yet the Diefenbaker government also wanted to ease friction with provinces eager to extend their jurisdiction. A mixture of caution and indecision delayed its solution of the pension portability problem. In the vacuum Ontario acted. In April, 1960, in the wake of the Clark Report, Premier Leslie Frost appointed a technical committee to tackle the issue. By 1962, Frost's successor, John Robarts, had a draft Pension Benefits Bill and a chorus of angry employers, denouncing the requirement that every firm with fifteen or more employees must establish a private pension plan to be overseen by a new Pension Commission of Ontario. Somewhat softened, at business's behest, the bill became law in the Spring of 1963.[92] Ontario's premier could face the electorate with another undertaking 'done'. Private enterprise and public regulation fitted the government and the growing pension industry.

X CANADA PENSION PLAN

By the early 1960s, the private pension industry could boast that it had provided coverage for close to two million workers, a third of the non-agricultural workforce. The 3,932 private plans in 1953, expanded to 15,131 plans in 1965. Insurance and trust companies plied a profitable, if competitive business while their public image was enhanced by a smooth trade association, the Canadian Pension Conference. Coverage, benefits, even vesting privileges all were improving.[93] Laurence Coward, spokesman for the pension industry and, by no coincidence, first chairman of Ontario's new Pension Commission, congratulated his colleagues on furnishing 'a compelling, almost irrefutable argument that private business in a free enterprise economy can and does respond rapidly and with great certitude to economic circumstance.'[94]

Not everyone agreed. If a third of working Canadians had some occupational pension, two-thirds did not. Seasonal, short-term and migratory workers had no hope of acquiring pension credits. Unions pointed to cancelled or vanished pension funds, decried the tight vesting rules in most plans and insisted that they were the only organized voice of 'pension consumers'. The possibility that their demands would lead to a state-run pension system left unions, as Gordon Milling of the United Steelworkers confessed, 'admittedly unworried'.[95]

In April 1963, as Robarts turned his Pension Benefits Act into law, Lester Pearson formed a minority Liberal government in Ottawa. On April 22nd, as the new cabinet ministers were announced, a telegram from Robarts invited the new prime minister to call a federal-provincial conference to co-ordinate pension plans. Co-operation was not on the mind of Pearson's new Minister of Health and Welfare. Within weeks, Judy LaMarsh had coaxed her officials, armed as they were with an array of policy materials, to devise an unfunded, pay-as-you-go version of a Canada Pension Plan, with the promise of low costs and a quick pay-out. A minority government could not wait for 'pie in a rather distant sky'.[96]

Provinces could. Quebec, for one, wanted all the funds it could muster for its ambitious development plans and a funded provincial pension plan was an ideal source. Ontario might have less need of capital but it had no intention of being a milch cow for the rest of Canada. After LaMarsh's clumsy attempt to use her CPP to win votes for provincial Liberals in 1963, Robarts had a right to political vengance. Far from winning instant popularity, the Canada Pension Plan was born into savage controversy. John Diefenbaker thundered that the goverment, instead, should add ten dollars to the old-age pension. David Kilgour of Great West Life, issued copies of his speech on the CPP descriptively title 'Let's Raise a Storm'.[97]

The prime minister and premiers met in Quebec City on March 31, 1964, amidst elaborate police precautions and glowering nationalist crowds. The atmosphere was not relieved when Jean Lesage, the Quebec premier, delivered a 500-page report on a funded pension plan that, to capital-hungry premiers and awed journalists, seemed beyond argument. Ottawa's traditional dominance in social policy was threatened. The upshot was compromise: both a Quebec and a Canada Pension Plan, compatible but separately and massively funded, with the capital available to the provinces. Roberts, who had always favoured a national scheme, emerged as both a national statesman and as owner of a large share of the potentially enormous CPP fund. By imposing a complex amending formula on the CPP, Roberts also achieved his governments' goal of minimising the plan and maximising the field left to the private pension industry. Most of his fellow premiers were content.[98] While benefits would be phased in, full contributors could expect $104 a month from the CPP (plus an old-age security payment that had climbed to $75 and became available by 1970 at age 65). In 1966, the Old Age Security Act was amended to provide, in co-operation with the provinces, a Guaranteed Income Supplement (GIS) for pensioners with little or no income. Contributions would be based on 1.8 per cent of incomes from $600 to $5000, matched equally by employers. The self-employed would supply both halves.[99]

Thirty years after the United States, the CPP gave Canadians their own version of a universal contributory pension plan. As supporters and critics alike had predicted, the private pension industry easily survived. Unions urged that existing plans be 'stacked' on the CPP; employers were equally insistent that plans be 'integrated', adding nothing to their pension outlay. In non-union situations, employers had their way; where unions existed, members of the collective bargaining unit set their own priorities, frequently guided by the predominant age grouping.

XI INDEXATION

The Canada and Quebec Pension Plans had solved, albeit in some eyes inadequately, the problems of pension coverage and portability. Neither problem matched the far more corrosive issue of inflation protection. Nothing mocked the virtues of thrift and providence more than the prospect that systematic and patient saving would be worthless at retirement. Yet no sooner had most Canadians gained some form of pension protection, whether voluntarily or by compulsion, than that was their apparent prospect.

Inflation was no novelty in twentieth-century Canada. Persistent price increases had taken off in the period from late 1916 to 1919. The value of the dollar had virtually been halved in the wartime years, before an acute postwar recession brought prices tumbling. The memory of that bout with inflation, however mild by European standards, steeled the hearts of government and people during the Second World War. After a severe bout of price increases in 1941, rigid controls had maintained remarkable price and wage stability in wartime Canada, lost again in the postwar period of 'orderly decontrol'. Post-1945 inflation was accompanied by such dramatic growth in real purchasing power that most Canadians were substantially better off. Among the conspicuous exceptions were the elderly, bound by fixed incomes, shrinking savings and by the limits of their means-tested old age pensions. Political pressure and obvious need had forced pension rates from the original $20 to $25 in 1943 and gradually to a still-inadequate level of $75 in 1963.[100]

The plight of pensioners and the evils of inflation had inspired Robert Clark, in his pension study, to deliver a powerful homily on behalf of price stability. Having reviewed the benefits and particularly the disadvantages of three methods of adjusting pensions to rising living costs, Clark's preferred prescription was a fourth -- preventing inflation.[101] In the late 1960s and the 1970s that was more easily said than done. When the CPP emerged, Ottawa boldly included inflation protection -- an indexation of up to two per cent a year. A 1969 study of 136 private pensions by the National Trust lists only two of the plans with any similar feature. In both cases, employees were expected to contribute 5 per cent of their salary less CPP contributions in return for no more than two per cent of indexation per year.[102] With inflation reaching six or seven per cent and reaching into two figures by the mid-1970s, protection was minimal. Very few Canadians even hoped for such shelter. In 1970, the President of the Privy Council reported to Parliament that only 191,700 Canadians enjoyed indexed pensions. Federal employees soon joined them.[103]

Ottawa could sustain its generosity from the public treasury as well as from civil service salaries. Managers of private plans could only raise premiuums, reduce immediate benefits with the promise of later improvements or, increasingly, exploit their freedom to invest adventurously in the equity market, always provided that their judgement was sound and the invested funds were free to be used. Such techniques hardly represented a solution.

XII CONCLUSIONS

A cursory history of occupational pensions in Canada cannot hope to settle debates about inflation protection or the ownership of pension surpluses. It can suggest changes in motives, values and expectations.

Early pensions did not grow entirely from the kindness of employers. They evolved from recognition that no amount of thrift could produce retirement security from an industrial wage. Pensions began as a device for systematising thrift through regular contributions. They evolved in this century as a managerial device for ensuring discipline and preventing labour turnover. When that proved unnecessary in the 1930s, a healthy share of pension cost was transferred to employees. Governments were left, with some misgivings, to offer minimal income support to the poorest of the elderly through means-tested pensions. Self-financed Government Annuities were attacked by an emerging private pension industry as soon as they were recognized as competitors.

Until the 1940s, the beneficiaries of pension plans had little voice in their management. In the United States, an 1898 court decision established the employer's absolute prerogative in company pension plans; in Canada the issue seems not to have been raised. Even the few union benefit and superannuation schemes operated by craft unions were managed at arms' length. Power shifted in the 1940s because unions gave many workers a collective voice and, even more, because prosperity created the expectation that poverty in old age was no longer inevitable. When millions of ordinary Canadians came to that realization, governments, financial institutions, even many employers had to recognize that people would, in the end, impose their will.

Provisions for income security in old age in Canada is no longer a responsibility left to the individual, the family or even the employer. It is a burden shared by an entire community. How the responsibility should be apportioned, how to find the necessary resources and how to share them are problems for the present and the future. Historical study can describe paths chosen and paths rejected. It can embody the caution and the optimism of experience. It cannot prescribe.

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Pension Plans In Ontario: A Statistical Overview

Michael C. Wolfson

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Pension Plans in Ontario: A Statistical Overview

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I INTRODUCTION

This overview presents a variety of data on 'private' pension plans under the legislative authority of the Government of Ontario. These are sometimes referred to as employer-sponsored or occupational pension plans. Since none of these terms is strictly accurate - some plans cover employees in the public sector, some are union sponsored, and they often cover more than one occupational group - we shall refer to them by their technical name under the Income Tax Act as Registered Pension Plans or RPPs.

The purpose of this overview is to provide background to the Ontario Task Force considering mandatory provisions for inflation protection in RPPs. This purpose gives a focus to the statistics to be presented. First, it is useful to provide a general picture of the range and diversity of RPPs which fall within the purview of the Task Force. Second, the data are being used to support the detailed work on actuarial cost estimates for the various inflation protection proposals being considered by the Task Force. It is important in such costing analysis to break the broad mass of RPPs into a reasonable number of more homogeneous groups. Finally, trend data showing the historical evolution of RPPs can serve an important role in providing the context for evaluating various inflation protection proposals, for example, the degree to which mandatory inflation protection should be retroactive.

II DATA SOURCES

All the statistics to be presented come from censuses of all RPPs in Canada maintained by Statistics Canada. These data come originally from the various pension regulatory authorities, in particular for Ontario plans the Pension Commission of Ontario. The regulatory authorities transcribe data from all the RPPs under their direct jurisdiction onto standard forms provided by Statistics Canada, and in turn they are put into computerized databases.

The basic forms remained unchanged from 1970 to 1984, so there is very good historical continuity in the data. On the other hand, the original 1970 form does not anticipate many of the policy issues that have arisen since that time, so that in a number of important respects, the available data are seriously limited. For example, there are no data on ad hoc indexing practices, only whether or not the RPP provides some measure of automatic indexing. There is also no information on retroactive plan improvements such as updates to the earnings bases of career average plus.

Statistics Canada produces a biennial publication based on these data, Pension Plans in Canada (catalogue no. 74-401). The reader is encouraged to consult this series of publications both for definitions of any technical terms used below, and for further information and background.

III THE UNIVERSE OF DISCOURSE

We begin by showing in Table 1 the overall picture of RPPs in Canada - how their numbers and numbers of members have evolved from 1970 to 1984, and how the portion under the purview of the Task Force relates to the totals for Canada.

The regulation of RPPs is generally in provincial jurisdiction. The main exceptions are for those sectors that fall under federal jurisdiction (eg. banking, transportation), and RPPs established under separate legislation and hence that are exempt (eg. MPs, federal public servants, RCMP). Many RPPs in provincial jurisdiction cover employees in more than one province. As a result, a system of reciprocal agreements among provincial regulatory authorities has evolved.

An RPP is typically registered in the province with the plurality of its members. However, members of that RPP in another province fall under the jurisdiction of that other province. The other province then administers its own regulations with respect to the members of the RPP working there. For example, the Ontario members of an RPP registered in Manitoba would be subject to Ontario's vesting rules.

Thus as shown in Table 1, in 1984 the number of RPP members potentially affected by an Ontario law mandating some form of inflation protection is the 1.79 million plan members working in Ontario, less the 168 thousand working in industries under federal jurisdiction and the 160 thousand who are members of plans that are exempt from regulatory legislation such as those for Members of Parliament, the federal public service, and the RCMP. This leaves a total of 1.46 million employees in 8,752 plans.

Comparing these figures with those in earlier years, Table 1 shows that the number of RPPs has been fairly stable over the fourteen years from 1970 to 1984. The number of plan members within the purview of Ontario legislation, however, has grown by about 50% over the period, with most of this growth in membership occurring in the 1970-78 period.

It is worth noting that this analysis is confined to RPPs. Thus it should not be taken as indicative of the extent of coverage of the Ontario work force by private retirement arrangements. In particular, no account is taken here of RRSPs.

IV GROUPING OF RPPs BY TYPE

As noted above, one objective of surveying the characteristics and diversity of RPPs with Ontario members is to provide a sound empirical basis for analysing the prospective costs of alternative provisions for mandatory inflation protection. For this purpose, it is useful to try to break down the universe of RPPs into a few 'pure' types. Of course, given the variety of RPPs, this can never be done perfectly; but it should be possible for the majority of RPPs.

One of the key distinctions is between defined benefit and money purchase RPPs. Inflation protection is an issue for both kinds of RPPs. However, in the first instance plan sponsors would bear all the costs of improved indexing of defined benefit RPPs, and none in the case of money purchase RPPs. (Indeed, members of money purchase RPPs would not bear any costs either. Instead they would face a different time profile of benefits - lower just after retirement and higher later.)

Among defined benefit plans, there are three main kinds of benefit structures: flat benefit, final or best average, and career average. In the case of flat benefit plans, a further distinction is between single-employer and multi-employer plans, since the latter type of defined benefit plans also tend to have characteristics similar to money purchase plans (i.e. they are also defined contribution or money purchase-like from the viewpoint of employers). This distinction between single- and multi-employer RPPs is not relevant for any other kind of defined benefit RPPs. On the other hand, whether or not the RPP requires contributions by plan members is relevant for the other types of defined benefit plans. These kinds of distinctions have been incorporated in the various tables to follow.

Tables 2 to 4 show some of the basic characteristics of RPPs for the years 1970, 1978, and 1984. The RPPs have been broken down into groups that take account of the distinctions just mentioned as well as whether or not the employer is in the public sector, and in that latter case whether or not the plan provides for contractual indexing of retirement pensions. We do not break private sector RPPs into groups according to whether or not they provide contractual indexing because virtually none of them do. The breakdowns of RPPs by type thus embodies an analysis of their distribution by various characteristics. Table 2 shows a detailed breakdown of RPPs for both the main types that will be used in the subsequent analysis and the additional residual categories.

V EVOLUTION OF RPP MEMBERSHIP, CONTRIBUTIONS, AND BENEFITS

The first 8 types of RPPs in Table 2 will be the main focus of this statistical analysis. As shown in Table 3, in 1984 these ‘pure’ types of defined benefit

RPPs covered 89.1% of all Ontario RPP members. After taking account of money purchase plans, only 4.8% of all Ontario members were covered by one of the residual groups of plans. However, in 1970, the 'pure' defined benefit categories of RPPs accounted for a smaller proportion of Ontario plan members, 78.3%, while the residual category covered 15.7% of all Ontario members.

The kinds of RPPs with the most members were public sector RPPs, both indexed and non-indexed, and flat benefit plans. Still focusing on Table 3, Ontario members of RPPs grew by 50.8% from 1970 to 1984. Both absolutely and proportionately, the largest increase in coverage occurred for public sector indexed plans. The second largest growth in coverage was for flat benefit multi-employer plans. While these latter plans still do not cover a large fraction of Ontario RPP members, their coverage more than tripled over the period. The sharpest decline in coverage was for career average private sector contributory plans. While the total number of money purchase plans declined by 507 from 1970 to 1984, membership grew such that this kind of RPP was roughly stable in accounting for about six percent of all Ontario plan members.

Table 4 shows the evolution of average contribution rates and average unit benefits, where relevant. The richest benefits and highest costs for plan members are in public sector indexed plans. These RPPs provide benefits of 2.00% of final average earnings per year of service, and members contribute 7% of their earnings. Non-indexed public sector RPPs provide the same unit benefits, but contribution rates are lower, having moved up from about five and three-quarter percent to almost six and one-half percent in the period from 1970 to 1984.

Among the 'pure' flat benefit plans, defined as those in the private sector which are non-contributory, average nominal dollar benefit rates have more than doubled for single-employer plans, and more than quadrupled for multi-employer plans to $16.16 per month per year of service. (Recall from Table 2 that fewer than 10% of all flat benefit plan members were not in a 'pure' type of flat benefit plan.)

In terms of contributions, the remaining four kinds of private sector RPPs -- final or best average and career average -- have been essentially constant over time, either because they are non-contributory or the average contribution rate has not changed appreciably. On the other hand, their average unit benefits have increased somewhat. Non-contributory final or best average plans show the largest increase of about one-third in the average value of their benefits, from 1.12 to 1.49 percent per year of service.

VI BENEFIT AND CONTRIBUTION LEVELS

We turn now to a more detailed examination of the benefits and contributions in each of the three main types of private sector defined benefit RPPs. (The benefit structures and contribution rates in public sector RPPs have not changed appreciably over the period, except as noted above and for the introduction of automatic indexing.)

A Flat Benefit Plans

Figures 1.a to 1.d show the distribution of benefits in 'pure' flat benefit RPPs as they have evolved from 1970 to 1984. (These plans are all non-contributory.) There are two ways to look at this evolution, in terms of the number of plans or the number of employees covered by those plans. Figure 1.a shows the distribution of Ontario flat benefit RPPs (both single- and multi-employer) by benefit level in 1970. Most of these RPPs provided from $2 to $5 per month per year of service. In contrast, Figure 1.b shows the number of plans in 1984 by benefit level. This graph shows most plans providing benefits in the $5 to $12 per month per year of service range.

Figures 1.c and 1.d give a somewhat different perspective on this evolution. This time, the heights of the bars in the graphs are proportional to the number of members in plans at each benefit level in 1970 and 1984 rather then the number of plans. These figures show that from the member's perspective, the range of benefit levels was narrower - most at $5 per month per year of service in 1970, and most at $11 or $12 in 1984, with some secondary clusters at higher benefit levels. As already shown in Table 4, these figures show that the average level of benefits in flat benefit plans roughly tripled over the 1970 to 1984 period.

B Career Average Plans

Figures 2.a to 2.d provide corresponding data for 'pure' private sector career average plans. These figures are, however, considerably more complex because they show both benefit levels and employee contribution rates. (This was not necessary for the flat benefit plans because they are non-contributory.) Along the horizontal axis, the level of benefits per year of service is shown as a percentage of career average earnings, and the vertical axis shows the level of required employee contributions as a percentage of annual earnings. (If the RPP was integrated with the C/QPP, these benefit and contribution rates are the ones that applied above the C/QPP's maximum pensionable earnings.) In Figures 2.a and 2.b, the number of plans is indicated by the diameters of the circles, while in Figures 2.c and 2.d, the diameter of the circles is proportional to the number of members located at each combination of benefit and contribution rates.

It is interesting to note the 'streaky' character of these scatter plots. Instead of a diffuse cloud of circles, the circles tend to be clustered along distinct vertical and horizontal lines. These lines correspond to the 'round number' levels of benefits and contributions adopted by most RPPs in practice. The most pronounced vertical streak in Figure 2.a, for example, is at 2.0%, with secondary vertical streaks at 1.5% and 1.0%. This corresponds with the fact that in 1970, most private sector career average RPPs offered unit benefits equal to 1.0 or 1.5 or 2.0 percent of career average earnings per year of service. Similarly, the plans seem to cluster along horizontal streaks at zero and 5% contribution rates. The zero contribution rate represents non-contributory career average RPPs.

Comparing Figures 2.a and 2.c highlights the difference between focusing on plans and on the numbers of employees covered by those plans. For example, in Figure 2.c the non-contributory plans appear more significant than in Figure 2.a. This implies that these career average RPPs are above average in numbers of covered employees.

Comparing Figures 2.c and 2.d shows the evolution of career average plans over the 1970 to 1984 period in terms of the numbers of plan members.

Two major trends are evident. First, there are more non-contributory plans; and second, there has been a general ‘eastward’ drift in the levels of benefits. In other words, among private sector career average RPPs, the contributions required of employees have fallen while levels of promised benefits have increased. In particular, an increasing number of career average plans offered unit benefits greater than 2.0%.

It may be noted that Revenue Canada imposes a maximum on the benefits that an RPP can offer of 2.0% per year of service up to a maximum of 35 years, or 70%. However, this maximum applies to final average plans, and career average earnings tend to be considerably lower than final average earnings. Revenue Canada takes this into account in allowing career average plans to be registered even though the unit benefit is greater than 2.0%.

C Final Average Plans

Figures 3.a to 3.d are exactly analogous to Figures 2.a to 2.d except that they show the benefit and contribution levels for private sector final or best average plans. Figures 3.a and 3.b give the plan weighted scatter plots, while Figures 3.c and 3.d give the membership weighted results, each for 1970 and 1984 respectively. Again, the figures show a pronounced ‘streakiness’. There are distinct clusters of plans along horizontal and vertical lines corresponding to round number rates of benefits (mainly 1.5% and 2.0% with a secondary streak at 1.75%) and employee contributions (mainly zero and 5% with a secondary streak at 6%). To highlight the difference between the plan weighted and the membership weighted perspectives, the reader can compare non-contributory 2.0% plans in 1984 (i.e. Figures 3.b and 3.d): these plans appear much more significant from a plan weighted perspective (i.e. the diameter of the circle above 2.0% along the horizontal axis and at zero vertically is larger in Figure 3.b).

As in the case for career average and flat benefit plans, there is a clear eastward drift (i.e. increasing trend) in the levels of benefits, both for contributory and non-contributory final or best average plans. However, unlike career average plans, there also appears to be some northward drift, indicating some increase in contribution levels.

VII CHANGES OF PLAN TYPE

The discussion so far of Ontario RPPs has given an overview of the main types of RPPs, how the mix of plan types has changed, and how benefits and contributions within each of these 'pure' types of RPPs have evolved over the period from 1970 to 1984. In the latter case, the main conclusion is that there has been a trend toward improvements in benefit levels within each type of private sector defined benefit RPP. However, changes in levels of unit benefits and contribution rates are only one way RPPs may have been amended over the period. We should also take account of the fact that amendments to RPPs may have caused the RPP to change type, for example from a career average form of benefit to a final or best average form. This particular kind of change is an improvement because the final or best average earnings base results in considerably higher pensions than an unadjusted career average earnings base with the same unit benefit. (Note that many career average plans have been retroactively updated on an ad hoc basis. Also ancillary benefits like survivor pensions and special retirement have also been improved over the 1970 to 1984 period. Unfortunately we have no data or only limited data on these kinds of plan improvements.)

It is possible to measure the extent of changes in plan type for Ontario RPPs over the period 1970 to 1984 because the Pension Commission of Ontario generally used the same identifier for the same plan year after year. These consistent identifiers provide the basis for linking plans longitudinally even where plan conditions have been amended. Unfortunately, in some cases it appears that amended plans were given new ID numbers. Thus, linking RPPs that have the same ID in 1970 and 1984 will understate the number of plans that actually continued to exist over the period, and it will overstate the number of plan 'deaths' and 'births' since 1970. Nevertheless, for 'continuing' plans, such a linkage allows the transitions among plan types to be examined.

Tables 5(A) to 5(D) present the results of such a longitudinal matching of Ontario RPPs. Table 5(A) gives counts of the number of plans. In both 1970 and 1984, there were about 8,500 Ontario RPPs - specifically 8,485 and 8,752 respectively. Of these, we have been able to find 3,515 that have the same ID in both 1970 and 1984, what will be called continuing plans. The balance of the 1970 plans - 4,970 - could either have been wound up, amalgamated with other plans, split into two or more plans, or continued but were amended such that they were assigned a new ID number. Only the latter case gives rise to an over-statement of plan deaths and a corresponding understatement of the number of continuing plans. Similarly, there were 5,237 births of new plans according to Table 5(A), where this number may also be overstated if actual continuing plans for some reason were assigned new ID numbers during the 14 year period from 1970 to 1984.

Table 5(B) is identical to Table 5(A) except that only plans with at least 1,000 members in either 1970 or 1984 are considered. Now there are only 176 such plans in 1970, 206 in 1984, and 162 continuing plans. However, among these large RPPs, it appears that the continuing plans are a much larger proportion than is the case in Table 5(A) for plans of all sizes. The implication is that the apparently high turbulence or turnover among RPPs indicated in Table 5(A) is concentrated among smaller plans (less than 1,000 members).

Tables 5(C) and 5(D) are again identical in format to Table 5(A) but this time they give counts of the numbers of plan members in each of the categories, first for all plans in Table 5(C) and then only for plans with at least 1,000 members in Table 5(D). In Table 5(C), we see that there were 840 thousand out of 970 thousand and 1.11 million members out of 1.46 million in 1970 and 1984 respectively who were in continuing plans, or about 75 to 85 percent. This compares to about 40% of plans that were continuing in Table 5(A). Finally, in Table 5(D) which shows only members of plans with at least 1,000 members, 85 to 95% were in continuing plans. These figures strengthen the impression that most of the turbulence or turnover in plans was among those with relatively few members. Still, the reader should bear in mind that there may be some overstatement of the degree of turnover (i.e. births and deaths) among Ontario RPPs in these tables due to a failure in matching all continuing plans. (A name search was done for all the large RPPs and only four additional matches were found.)

Returning to Table 5(A), among the 3,515 continuing plans, most did not cross the boundaries of the pure types that have been defined. 880 or about one-quarter changed type (compared to about one-third among the large plans in Table 5(B) - 52 out of 162). On the other hand, from a membership perspective, about half were in plans that changed type over the 14 year period (535 thousand out of 1.11 million in Table 5(C), and 443 thousand out of 845 thousand in large plans in Table 5(D)). Thus, even for continuing plans, many employees were covered by Ontario RPPs where the plans were amended to such a degree in the period from 1970 to 1984 that they crossed the boundaries of the pure types that have been defined for purposes of this analysis.

Turning now to a more detailed examination of these tables, the largest kind of change in plan type in terms of numbers of plans (i.e. in Table 5(A)) was from contributory career average to contributory final or best average (both private sector). Of the 401 continuing final or best average contributory plans in 1984, 161 were the same type of plan in 1970, 172 were career average contributory, and 68 were of some other type - so that 240 (401 - 161) changed into this type from some other type. In addition, there were 340 'births' of private sector final or best average contributory plans. (All these figures come from reading down the third column of Table 5(A).)

Table 5(C) gives a somewhat different perspective. Here the number of members is shown, and the largest transition among plan types is the 212 thousand public sector plan members whose final or best average contributory plans were amended to provide full contractual indexing. (However, from Table 5(A), it can be seen that these employees were in only 3 continuing plans.) The second largest transition was the 133 thousand plan members who moved from 'other' plans to not fully indexed public sector plans. It may be recalled from Table 2 that 'other' plans include composite plans (with more than one benefit formula) and public sector career average plans; these two plan types had 16 and 86 thousand members in 1970 respectively.

In the private sector, the largest transitions (from examining the off-diagonal entries in the first six rows and columns of Table 5(C)) were from

- contributory career average to contributory final or best average (27,200),
- contributory (15,800) or non-contributory (11,300) career average to non-contributory final or best average,
- contributory to non-contributory career average (10,100),
- career average to single- or multi-employer flat benefit (8,500 plus 3,400), and

- contributory to non-contributory final or best average (8,000).

In the case of money purchase plans, the table shows a total of 3,400 members of continuing plans that converted to money purchase, and a total of 17,800 that converted out of money purchase.

The basic impression gained is that most of these transitions from one plan type to another generally represented an upgrading of benefits or a reduction in employee contributions.

The largest numbers of 'births' in terms of plan members were for flat benefit plans (72 and 82 thousand for single- and multi-employer respectively). The largest number of deaths were in contributory career average plans (42 thousand members).

VIII CHANGES IN EMPLOYER COSTS

The discussion in the previous section of births and deaths of RPPs and the changes in their types of benefits has given an impression that benefits were generally being upgraded over the 1970 to 1984 period. These benefit promises constitute a liability to the pension plan, so that another way to assess this trend is to consider the costs to employers of their RPP obligations. In this section, we shall examine the evolution of employers' costs from two perspectives. The first is the actual cash contributions made by employers to their RPPs, and the second is a set of actuarial valuations of the plans' liabilities, i.e. the expected value of their promised benefits.

Because the latter costing is quite complex, the analysis has been restricted to the same group of large Ontario RPPs as were shown in Tables 5(B) and 5(D) above - those with at least 1,000 members in either 1970 or 1984. As shown in Table 5(B), there were 162 large RPPs for which we have linked data for the years 1970 and 1984. These 'continuing' plans are the group of RPPs to which the analysis in this section will be restricted.

A Data and Limitations

Unfortunately, there are a number of significant limitations to the available data for these RPPs. For all of these RPPs, we have the total amounts contributed by employers in dollars, as well as the number of plan members. However, there are no data on the total wages of each RPP's members, so that it is not possible to compute the employer's actual dollar contributions as a percentage of payroll. An approximation has been made based on the assumption that each plan's members had average earnings equal to the average industrial composite wage in the year in question. (The average wage in 1970 was $6,590 while in 1984 it was $21,065.) Thus, **current dollar costs** have been computed as total dollar contributions by the employer in respect of current service costs divided by the total number of plan members and by the average wage. **Total dollar costs** refers to the corresponding ratio where the numerator is the sum of current service costs plus amounts contributed to amortize experience deficiencies and unfunded liabilities.

Another set of limitations concerns the level of detail on the benefits provided under each RPP. These details on benefits are essential to computing the **actuarial cost** of the plan. Current service actuarial costs were computed using exactly the same costing model as has been used in the companion study by Wm. M. Mercer Ltd. on the costs of alternative inflation protection reforms. For many plans, not enough information was available to compute the actuarial cost. RPPs for which sufficient information was available are referred to as 'well defined'. The required information included

- the precise form of the unit benefit (eg. final five year average),
- the levels of the unit benefits and employee contributions,
- the form of integration with the C/QPP if any,
- vesting age and service requirements,
- the extent of contractual indexing post-retirement if any,
- the ratio of male to female members,
- normal and special retirement ages, and

- survivor pensions and post-retirement death benefits.

Of the 162 continuing large RPPs, 89 were well defined. While it may appear that this is a rather small number of plans, these 89 well defined plans had 676,000 members in 1984 - about two-thirds of all the members of large Ontario RPPs and about one-half of the members in all Ontario RPPs.

In this section where changes in employers' costs will be used as a measure of benefit improvements, a particular focus will be on 'private average' plans - private sector career or final or best average, contributory or non-contributory plans (plan types 3 to 6 in Tables 5(A) to 5(D)). These plans are of interest because it is only with the use of dollar or actuarial costs as an index that we can find some comprehensive measure of the way their benefits have improved over the 1970 to 1984 period. As shown in Tables 4 and 5(A) to 5(D) above, the tendency has been for unit benefits to increase, benefit formulae have been switched from career average to final or best average, and some plans have moved from being contributory to non-contributory.

Benefits have also been improved in other types of plans. However, there have not been as many changes in the types of benefits for these other groups of plans (recall Tables 5(A) to 5(D)) so that using costs as an index of plan improvements is not as important. Much of the improvement in the public sector plans has involved the introduction of contractual indexing as shown by the transitions between plan types 7 and 8 in Tables 5(A) to 5(D). But as shown in Table 4 above, the unit benefits have remained essentially unchanged at two percent of final average pay. Flat benefit plans have also been substantially upgraded. This has generally been the result of collective bargaining, and the upgrades typically include retroactive enrichments to cover already accrued benefits, including those of the retired.

As shown in Table 6, there were 85 large continuing Ontario 'private average' plans in 1984, with 188,000 members. The other plans are mainly in either the public sector (14 plans with 460,000 members) or are private sector flat benefit plans (41 single- and multi-employer plans with 146,000 members). Of these 85 plans, 42 were well defined. They had 91,000 members out of a total of 237,000 members for large Ontario private average plans and 491,000 Ontario private average plan members overall. Thus, the sample of private average plans being used is somewhat small. However, as discussed below, there is some evidence that this subset is not seriously biased. (Note that we are using the terms 'private average', 'public sector' and 'flat benefit' here to refer to plan group types 3 to 6, 7 and 8, and 1 and 2 respectively as used in Tables 5(A) to 5(D).)

B Current and Total Dollar Costs

Table 7 presents summary results on the current and total dollar costs of the RPPs under study. The plans have been divided into four groups: first the complete set of all continuing RPPs, then the subset of these that are well defined for purposes of actuarial valuation in both 1970 and 1984, then a different subset containing all the 85 private average plans, and finally the smallest group of 42 plans that are both private average and well defined.

Comparing the costs of the 'all plan' groups to those for their respective 'well defined' subsets gives an indication of the extent of bias in the subsequent analysis where we shall focus on the actuarial costs, which must of necessity be confined to the well defined plans.

Within each of the four main groups of plans in Table 7, both current and total costs are shown for both 1970 and 1984. In addition, since all of these RPPs have been linked between 1970 and 1984, statistics on the distribution of changes in costs plan by plan are also shown. It should be noted that the difference in the median (as well as the upper and lower quartile) costs in the two years will typically apply to two different RPPs. Thus it will not equal the median change in costs for plans over the 1970 to 1984 period. Of course, it is a matter of arithmetic that the difference in mean costs in the first two rows exactly equals the mean change in costs in the third row of statistics for each group of plans and type of cost. In general, the third row is of interest because it shows the wider range of changes in costs that actually occurred for individual plans over the period.

First on the overall results, it appears that current service employer costs in 1984 for large continuing Ontario pension plans tended to be in the range of about five percent of payroll (mean 5.5%, median 4.6%). These costs have increased somewhat over the period from 1970, by about 0.9 percent of payroll (both mean and median). One half of all these plans had current service costs between about two percentage points below this typical level of costs, and three percentage points above. In other words, the dividing line in the cost spectrum for the bottom 25% of all plans - the lower quartile - was 2.7% compared to the median of 4.6%, and the dividing line for the top 25% - the upper quartile - was 7.9% of payroll. Recall that these are estimates because actual payrolls have been approximated by assuming that all plan members earned on average amounts equal to the average industrial composite wage.

This increase in current service costs is only about half as much as the median and mean increases in total costs. This suggests that the amortization of unfunded liabilities arising from retroactive plan improvements has assumed an increasingly significant role. (Virtually none of the difference between current service and total costs was due to the amortization of experience deficiencies.)

Turning to the subset of continuing large Ontario RPPs that are well defined, we can compare the cost figures with those for all plans to obtain a general indication of any bias. The distributions of current service and total costs for 1970 and for 1984 do appear reasonably similar, generally differing by about one half a percentage point.

A similar set of conclusions can be drawn about the bias among the 'private average' plans in the bottom half of Table 7. Current service and total costs in both 1970 and 1984 are generally similar for all private average plans and for the subset of 42 which are well defined.

Finally, median current service costs for private average plans increased by 0.9%, about the same as the 0.8% increase for all plans. Median total costs increased somewhat more, by 1.5%. Thus, the general increase in amortization of unfunded liabilities noted above applies also to the private average plans.

The statistics in Table 7 give a convenient summary of the evolution of employer costs. Another view of this evolution is given in Figures 4.a to 4.d. These scatter plots show the joint distributions of current service costs for all large continuing Ontario pension plans, private average plans, flat benefit, and public sector plans respectively.

Unlike Table 7, the impression gained from inspecting these figures is less one of a systematic increase in costs than one of considerable heterogeneity. Actual pension plan costs are quite variable, and almost as many have experienced declines as have experienced increases in current service costs.

The number of plans taking 'contribution holidays' is indicated in the figures by the dots along either the horizontal or vertical axes. In comparing Figures 4.a to 4.d, the relatively low cost of the flat benefit plans is also notable.

C Actuarial Costs

We turn now to an examination of the actuarial costs of the 'well defined' subset of the plans whose dollar costs have been analyzed so far. As noted above, this actuarial costing makes use of the same actuarial model that has been used by Wm. M. Mercer in the companion cost study (and that was originally developed by Statistics Canada and the Department of Insurance in conjunction with the federal Green Paper on pension reform, 'Better Pensions for Canadians' (1982)).

The employee group used for all plans (i.e. the distribution of members by age, service, and salary) as well as the mortality and termination rates are the same as in the companion Stage I cost analysis, which in turn is the same as that used in the Business Committee on Pension Policy (BCPP) brief to the 1983 Parliamentary Committee on Pension Reform (the Frith Committee). Otherwise, the specific plan characteristics noted above with regard to the definition of well defined RPPs were used to value each plans' liabilities in each of the two years.

A key question in any actuarial valuation is the set of economic assumptions, particularly the interest rate used to discount future benefit payouts. To support this analysis, two sets of actuarial assumptions have been developed, one reflecting typical 1970 assumptions, the other reflecting typical 1984 assumptions. These assumptions are shown below. Two main sources of information were used for this purpose, the periodic Financial Executives Institute surveys of pension plan sponsors, and more importantly, the periodic analyses by the

Pension Commission of Ontario of the actuarial bases for all large (over 1,000 members) pension plans under their jurisdiction.

ACTUARIAL ASSUMPTIONS

	1970	1984
Interest	4.5%	6.5%
Salary	3.5%	5.5%
CPI	0%	3.5%

In addition to these assumptions, it was assumed that the benefits accruing to active members in career average and flat benefit plans would be updated regularly at a rate equal to the salary assumption less one percentage point. Also, employee contributions returned upon termination prior to vesting were assumed to earn no interest in 1970, and three percent in 1984. Finally, for any plans that provided contractual indexing in 1984, this was taken into account in determining the annuity factors for retirees.

The key feature of these actuarial assumptions is the two percentage point increase in the interest rate. It has the effect of substantially lowering the expected cost of otherwise unindexed (or less than fully indexed) pension benefits. The constant one percentage point difference between the interest rate and salary assumptions reflects the average actuarial practice tabulated by the Pension Commission of Ontario in their studies.

Table 8 presents the basic results of the actuarial cost analysis for the 89 well defined continuing plans, and the subset of 42 private average plans. The main difference between these results and those presented in Table 7, in addition to the different concept of cost, is the addition of an hypothetical scenario.

The first row of Table 8 shows the basic statistics on the distribution of costs for the plans based on their characteristics in 1970 and the typical actuarial assumptions for the same year. Similarly, the third row shows the actuarial cost statistics for the plans based on their 1984 characteristics combined with the typical 1984 actuarial assumptions. However, the second row shows hypothetical cost statistics where the 1984 characteristics of plans have been combined with the 1970 actuarial assumptions.

Thus, the increase in costs from the first to the second row in Table 8 shows the pure impact of benefit improvements, holding the actuarial assumptions constant. Comparing the first and third rows shows the change in costs when both the benefit improvements and the more liberal actuarial assumptions are jointly taken into account. And comparing the second and third rows show the impact on the costs of plans with their 1984 benefit structures of the liberalization in actuarial assumptions shown above.

As with Table 7, it is a matter of arithmetic that the difference between the medians of two distributions of RPP costs is generally not equal to the median difference in costs for a set of RPPs. Thus, the fourth through sixth rows of Table 8 show the statistics for the distributions of differences in costs among the three scenarios in the first three rows. The bottom half of Table 8 contains exactly the same statistics as the top half just described, except that the figures apply to the subset of private average plans.

Turning now to the substance of Table 8, for all well defined large continuing Ontario RPPs, average benefits, measured by their actuarial value, improved by 0.8% of payroll (fourth row). The improvement was more than twice as large at 1.8% of payroll for the private average plans, as shown in the corresponding row of the bottom half of the table. Median benefit improvements were similar in magnitude.

It is widely agreed that the change in actuarial assumptions over the period from 1970 to 1984 was associated with the increase in the rate of inflation, and its consequential impact on nominal interest rates. Thus, if inflation had been ignored, and actuarial assumptions left unchanged, it is clear that plan sponsors would have faced substantial cost increases as a consequence of the benefit improvements that were granted to active plan members. Such cost increases would have been larger than average for private average plans, as indicated by the median increase of 1.8% shown in the third last row.

However, plan sponsors not only improved benefits for active members. They simultaneously revised their actuarial assumptions. By itself, revising actuarial assumptions in the typical way shown previously will reduce the apparent cost of pension plan benefits. Since this is a paper calculation which has no effect on the assets of the pension plan, the reduction in liabilities has the effect of creating a surplus in the plan. Thus, the simultaneous impact of liberalising actuarial assumptions and improving plan benefits is first to create surplus and then to use it immediately.

This phenomenon is apparent in the bottom line of Table 8. The median change in actuarial costs for private average plans when both the changes in benefits and the change in actuarial assumptions are taken into account is exactly zero; and the mean change is close to zero at 0.3% of payroll. The lower quartile figure of -1.0% indicates that one quarter of the private average plans experienced a decline in employer costs of at least one percent of payroll.

Correspondingly, the upper quartile figure of 1.8% means that one quarter of the private average plans undertook substantial benefit improvements. These improvements imposed costs on plan sponsors of at least 1.8% of payroll over and above the amounts that would be financed by the surplus created by the liberalisation of actuarial assumptions.

The second last line of Table 8 shows another perspective on the interrelationship between benefit improvements and changes in actuarial assumptions. Here we see the reductions in the costs of 1984 benefits in private average plans that arise simply from changing the actuarial assumptions from those typical in 1970 to those typical in 1984. The cost savings are relatively uniform in the range of 1.3 to 1.8 percent of payroll. (Similar results are apparent for all plans in the top half of the table.)

One difference between the actuarial costs and the dollar costs as shown in Tables 8 and 7 respectively is the size of increase in current service costs from 1970 to 1984. The simulated actuarial costs showed almost no increase for private average plans when both the benefit changes and the changed actuarial assumptions were taken into account, and a decrease for all plans. On the other hand, current service costs in Table 7 increased by 0.7% of payroll for private average plans and showed a slightly larger increase of 0.9% for all plans.

Before commenting on the possible sources of these differing estimates of the costs or value of benefits, we turn to a graphical display of the actuarial cost results. Figures 5.a to 6.d amplify the results in Table 9 in exactly the same way as the scatter plots in Figures 4.a to 4.d did for Table 7.

Comparing Figures 4.a and 6.a, for example, illustrates the point just made about the different increases in costs from 1970 to 1984 indicated by the dollar and actuarial costs. The point cloud in Figure 6.a has a clear slope that is quite close to 45 degrees, while the cloud in Figure 4.a has a steeper slope. This corresponds to the somewhat higher mean and median cost increases for current service dollar costs as compared to actuarial costs in Tables 7 and 8.

Another apparent difference between the scatter plots for the actuarial costs and those for the current service costs is that the clouds of points for actuarial costs are more compressed. There is considerably more variation in actual dollar costs for these plans than we have simulated using the actuarial cost model. This restricted variability in the actuarial costs probably reflects a combination of factors.

The first of these is entirely spurious. Figures 4.a to 4.d cover all 162 continuing plans, while Figures 5.a to 6.d cover only the 89 well defined plans, so that the plots of current service dollar costs have almost twice as many points as those for the actuarial costs.

Nevertheless, there are a number of reasons for more limited variability in the actuarial costs. First, we have assumed identical employee groups and turnover rates for all plans. Second, there are a number of aspects of the benefit formulae that we have been unable to capture due to limitations in the data, such as pre-retirement death benefits and subsidized optional joint and survivor forms of pensions. This point in particular could account for the simulated actuarial cost increases being smaller than the actual dollar cost increases. Third, plan sponsors use a diversity of actuarial assumptions while we have assumed that they all used exactly the same assumptions each year. Finally, current service contributions may not be made solely on the basis of the accrual of liabilities each year. For example, the instances of contribution holidays in Figure 4.a must reflect the impact of the funded position of the plan - if the plan is in a surplus position, current service costs will be deemed to be zero even if substantial pension benefits are accrued during the year.

Beyond this basic difference in variability, there are substantial similarities in the shapes of the point clouds. For example, flat benefit plans tend to be low cost while public sector plans tend to be higher cost. The greatest diversity is among private average plans.

IX CONCLUDING COMMENTS

This analysis has examined the evolution of Ontario RPPs over the period from 1970 to 1984. To support the first stage of the companion analysis of the prospective costs of various forms of mandatory inflation protection by Wm. M. Mercer Ltd., a set of 'pure' pension plan types has been identified. These basic plan types covered 95% of all Ontario plan members in 1984.

The general picture that has emerged from examining the evolution of these Ontario plans is one of a trend toward upgrading benefits for active workers. (We have no data to indicate the extent to which these improvements were also passed on to the retired. There do appear to be substantial expenditures on retroactive plan improvements though we do not know how much these accrue to retirees as opposed to actives -- see below.) This apparent upgrading has taken the forms of increases in unit benefits, reductions in required contributions, and amendments to the benefit structures of plans that caused them to shift across the boundaries of the typology that has been defined.

The analysis then shifted in the last part to an examination of plan costs. These costs were used as a measure of the value of plan benefits, and as another indication of the extent to which plan benefits have improved over the 1970 to 1984 period. Two measures of cost were used. The first was the actual dollar contributions made by plan sponsors; the second was based on the same actuarial model as has been used in the William M. Mercer Ltd. cost study.

The analysis of actuarial costs has highlighted the role of changing actuarial assumptions. The benefit improvements that have been surveyed in the first part of this analysis would have cost plan sponsors much more if they had not simultaneously liberalized their actuarial valuation assumptions.

From a policy perspective, this analysis of the evolution of benefits in defined benefit plans has several implications. First has been the implicit redistribution from pensioners to plan sponsors and active plan members. The increase in the rate of inflation during the 1970s, with the associated increase in nominal market yields, provided the basis for a liberalization of actuarial assumptions. This in turn lowered the value of outstanding pension liabilities 'at the stroke of a pen', and released an implicit surplus that could then be reallocated either to fund improvements in the benefits of active plan members or to allow plan sponsors to reduce their contributions. The losers in such packages of changes were the retired. Their contributions or those of the employer on their behalf provided the pension fund assets which were now yielding these higher returns. Their nominal benefits of course continued to be paid, and indeed often upgraded by ad hoc increases. However, their real values were still substantially eroded by inflation.

With the benefit of '20-20 hindsight', it might have been more appropriate to have avoided such redistribution away from pensioners. Plan sponsors could instead have left their valuation assumptions unchanged, and could have used the surpluses that would have arisen (the result of what is sometimes called 'excess interest') more systematically to upgrade the already accrued benefits of pensioners and vested deferreds. The analysis above shows that this did not typically happen, and that redistribution occurred often in the period from 1970 to 1984 to the detriment of pensioners.

However, the analysis has also shown the very great heterogeneity in pension plans. This variety extends not only to the types of benefit structures and their levels, but also to the way plans have changed over time. While it may be that typically, private sector defined benefit plans have evolved in a way that in some people's views inappropriately redistributed implicit pension surplus away from pensioners, by no means all plans behaved in this way. Thus, any attempt to draft legislation that will in some way attempt to undo or reverse such inappropriate redistribution must be able to deal with the great variety of actual circumstances and the general complexity of analysis in this area. Any attempt to derive general or relatively simple formulae may run the risk of creating serious inequities.

Figure 1.a: Plans With Ontario Members, 1970

Non-Contributory Flat Benefit Plans
Number of Plans By Benefit Level

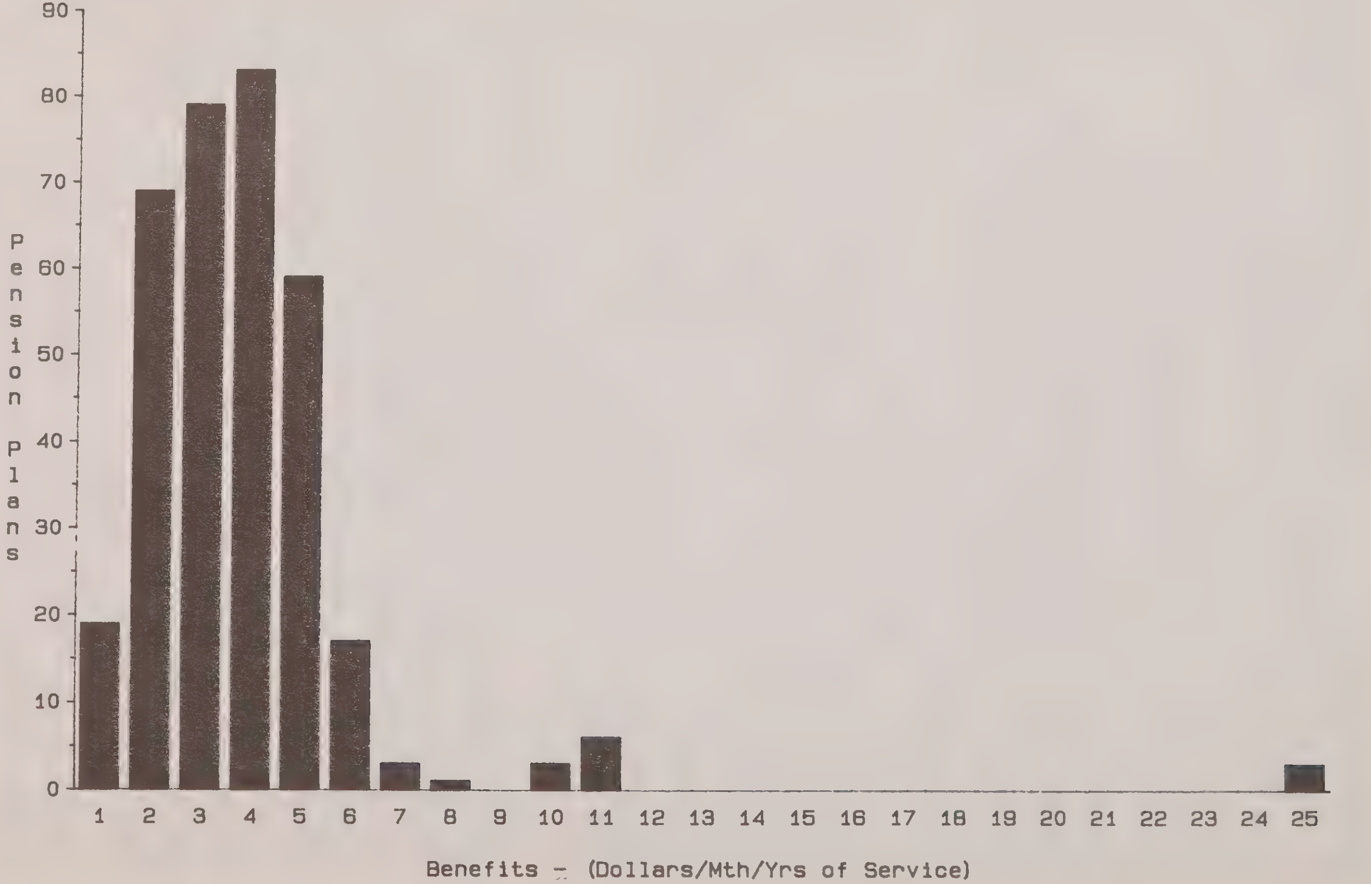


Figure 1.b: Plans With Ontario Members, 1984

Non-Contributory Flat Benefit Plans
Number of Plans By Benefit Level

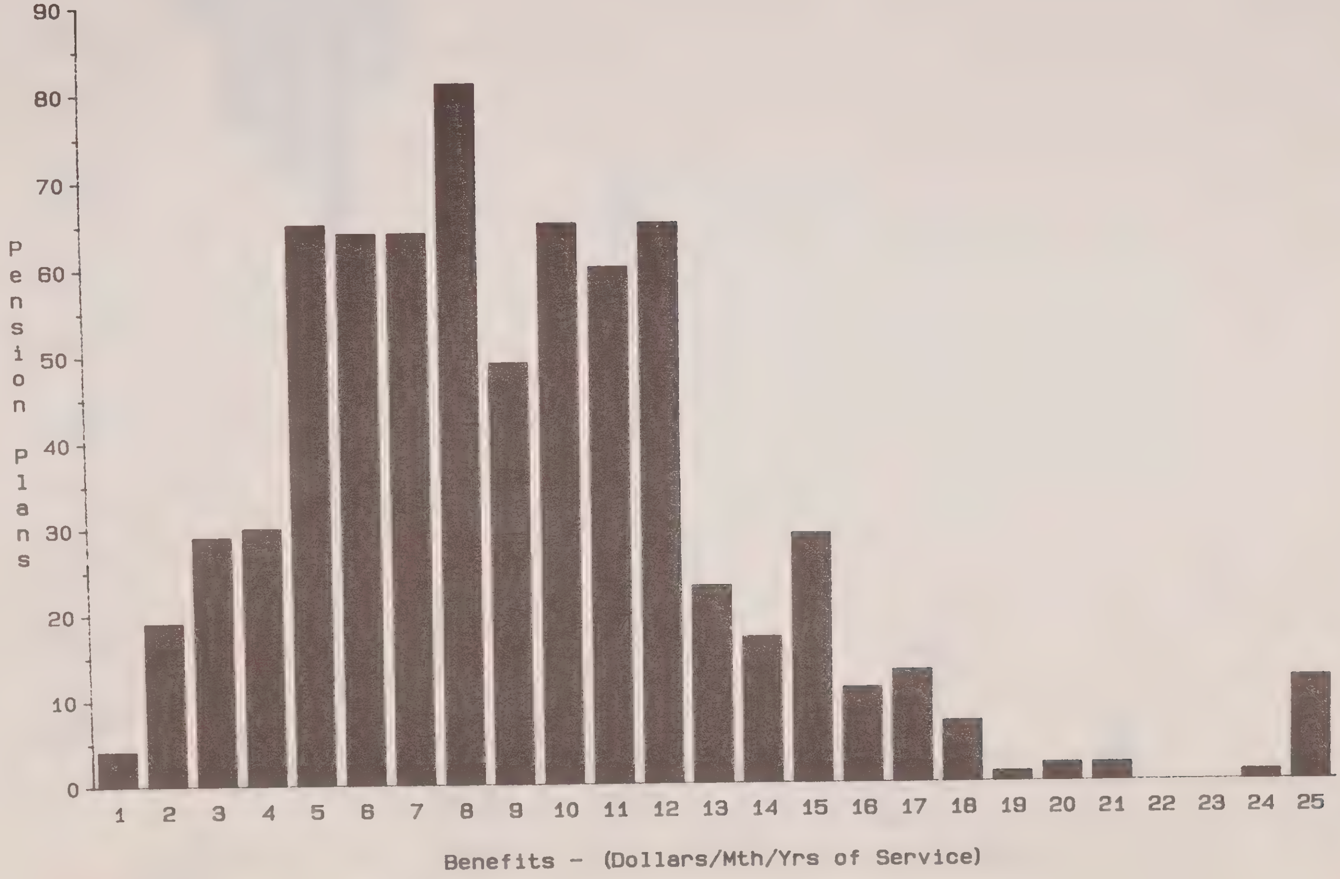


Figure 1.c: Plans With Ontario Members, 1970

Non-Contributory Flat Benefit Plans
Number of Members by Benefit Level

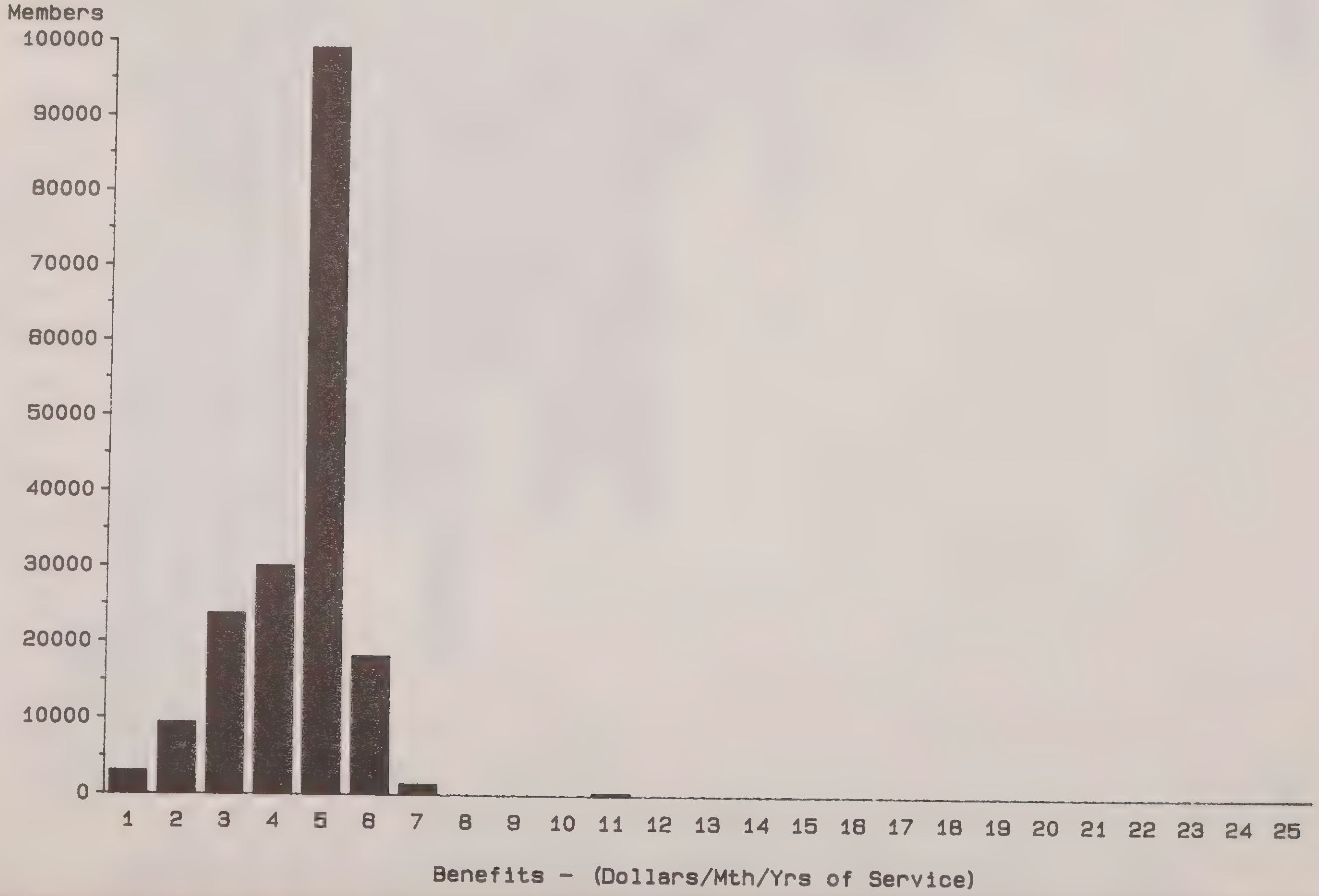


Figure 1.d: Plans With Ontario Members, 1984

Non-Contributory Flat Benefit Plans
Number of Members by Benefit Level

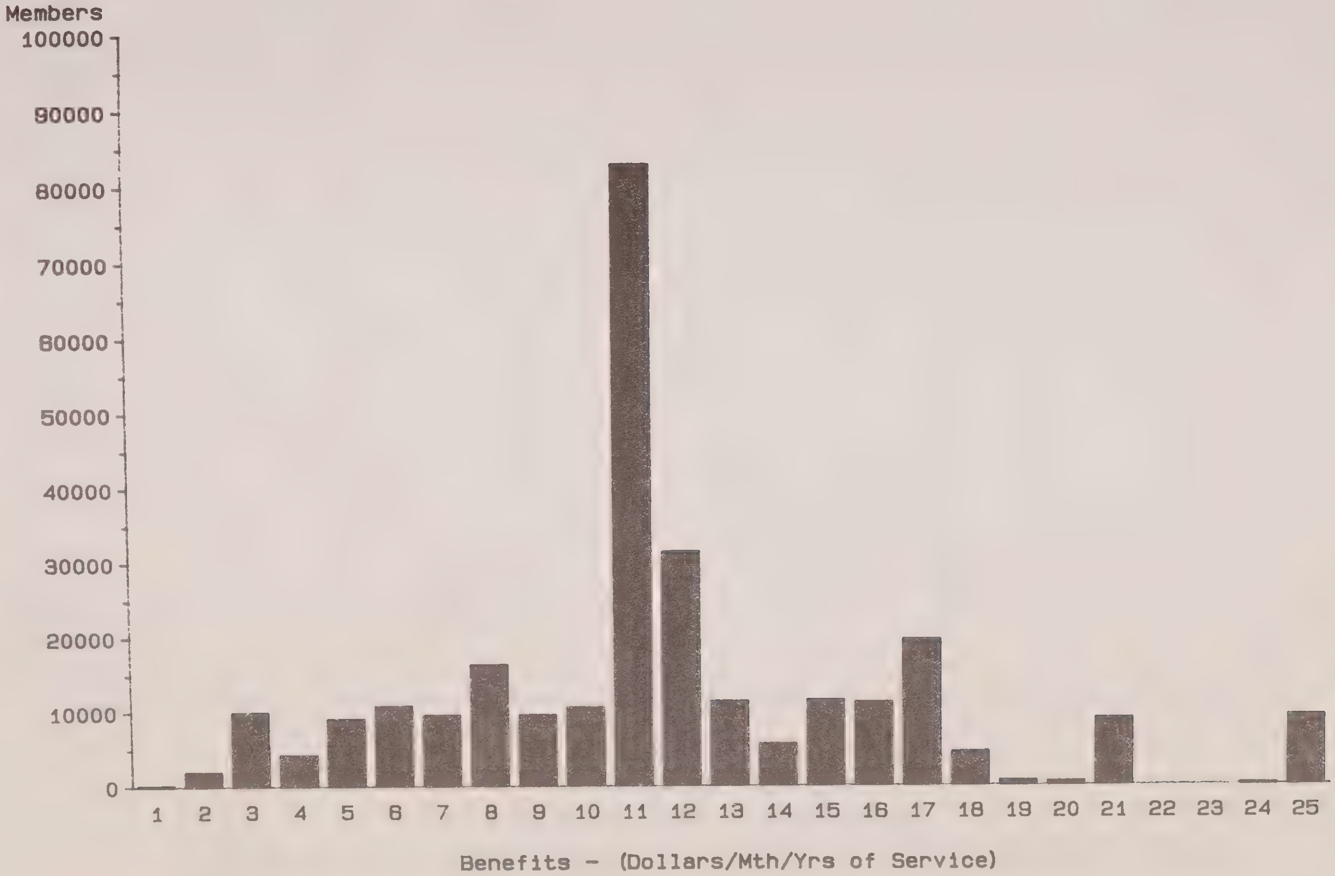
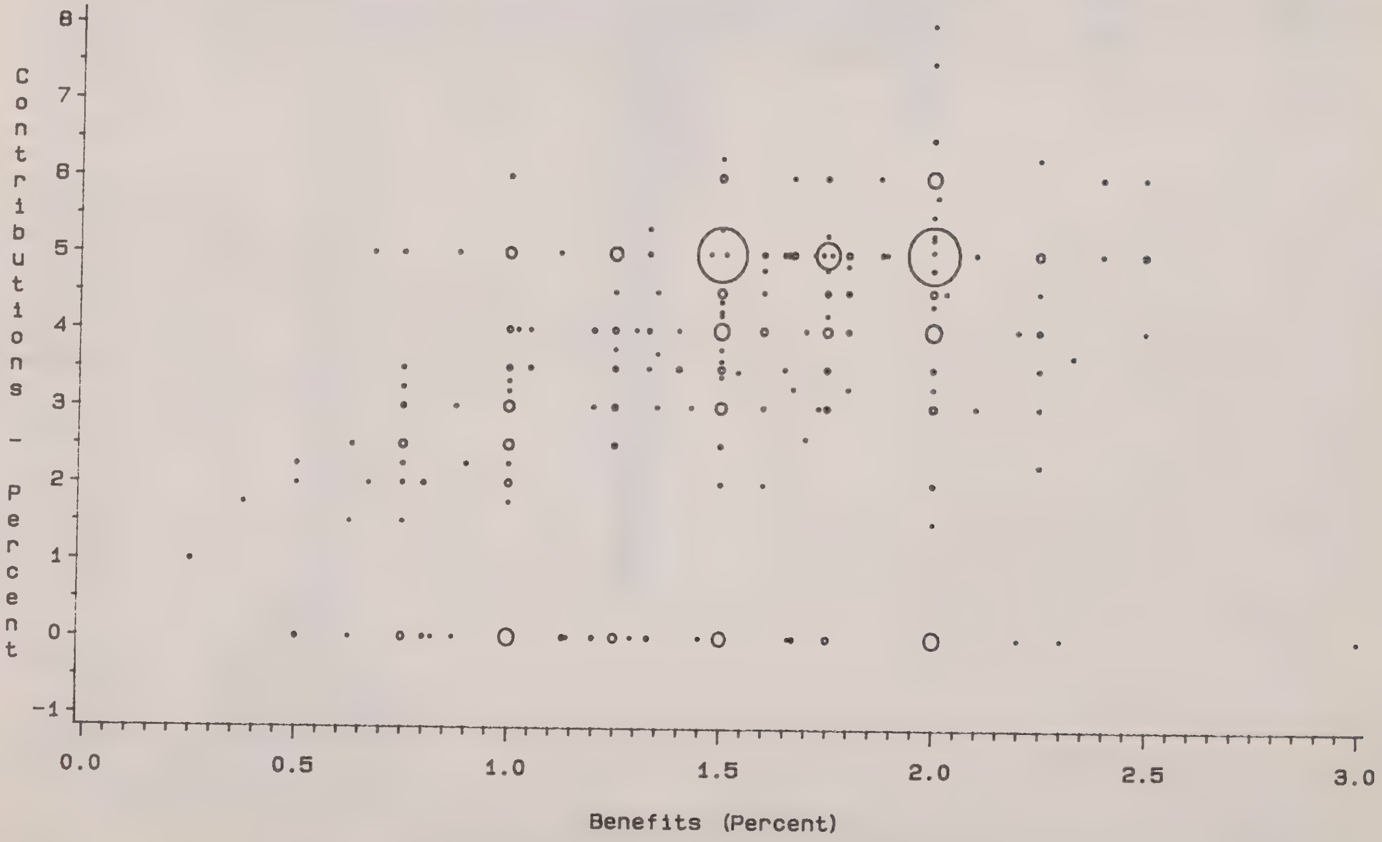


Figure 2.a: Plans With Ontario Members, 1970

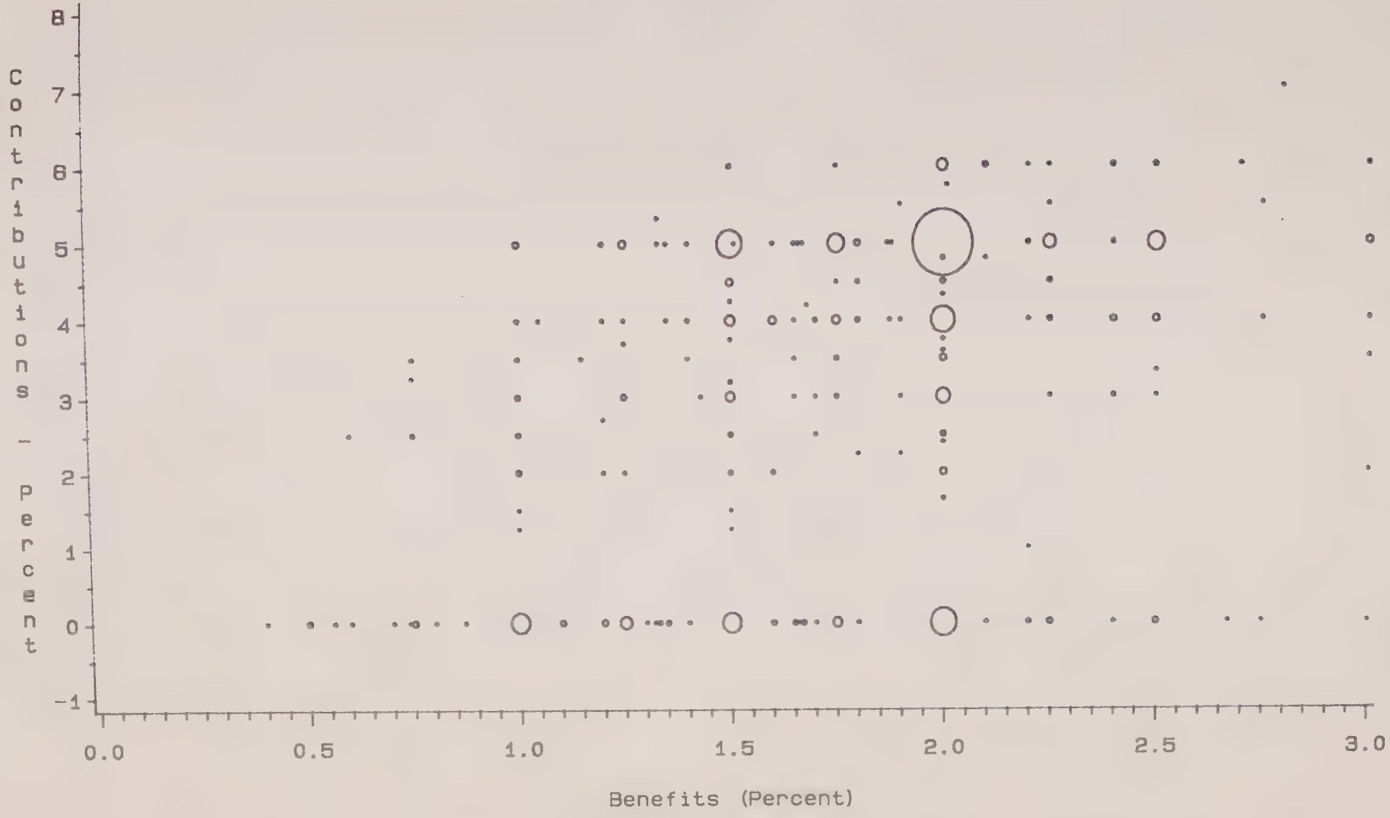
Private Career Average Plans



Area Proportional to Number of Plans

Figure 2.b: Plans With Ontario Members, 1984

Private Career Average Plans



Area Proportional to Number of Plans

Figure 2.c: Plans With Ontario Members, 1970

Private Career Average Plans

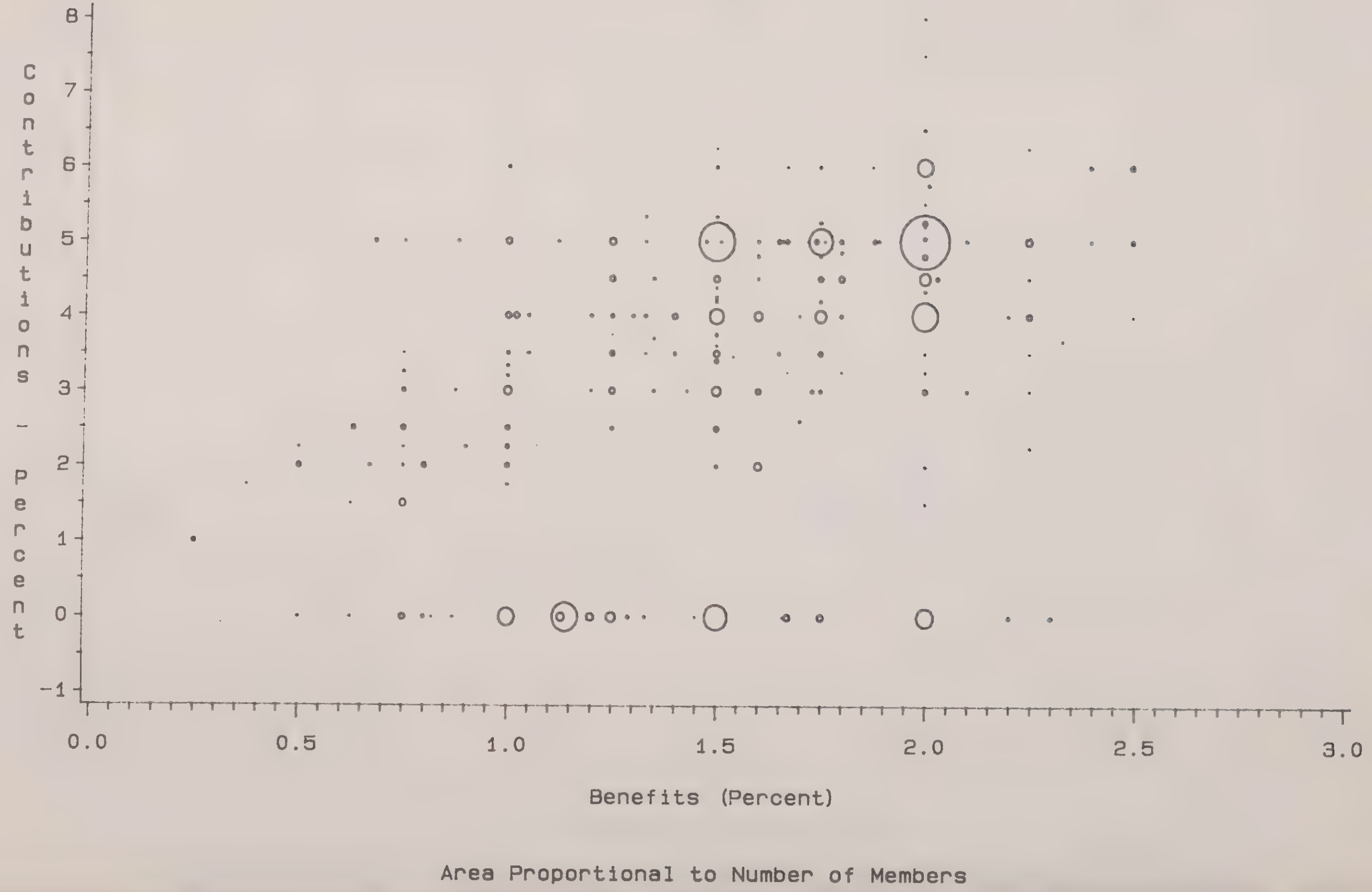
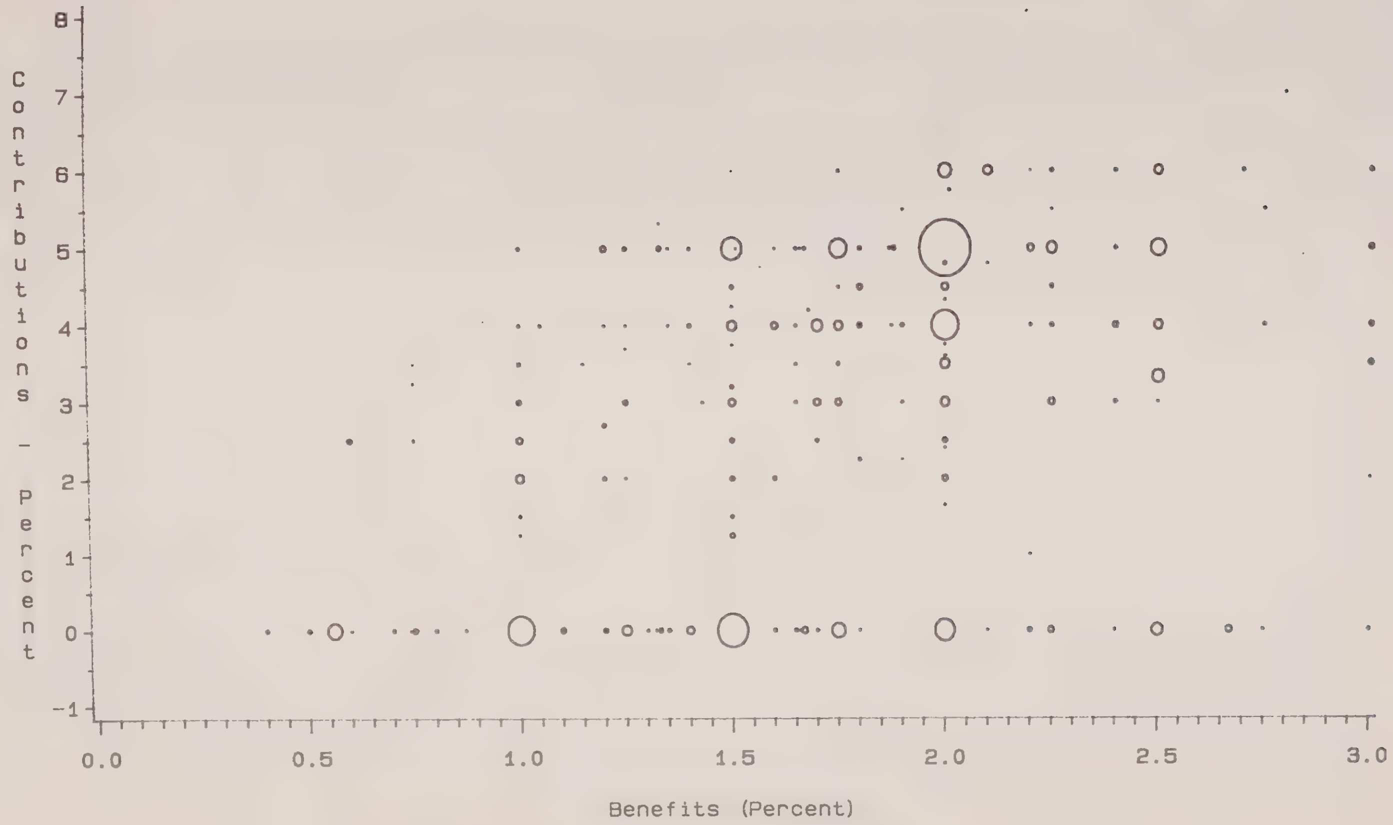


Figure 2.d: Plans With Ontario Members, 1984

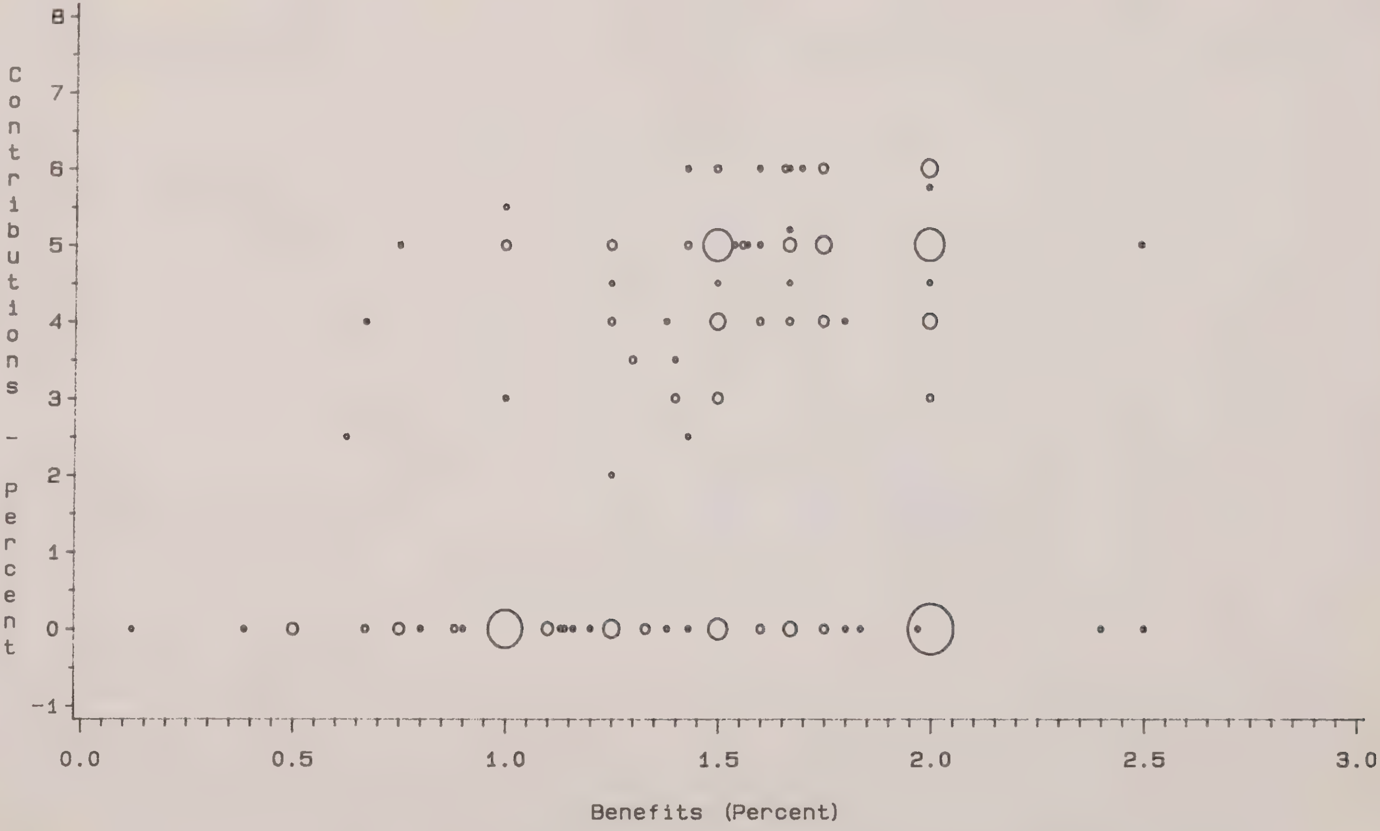
Private Career Average Plans



Area Proportional to Number of Members

Figure 3.a: Plans With Ontario Members, 1970

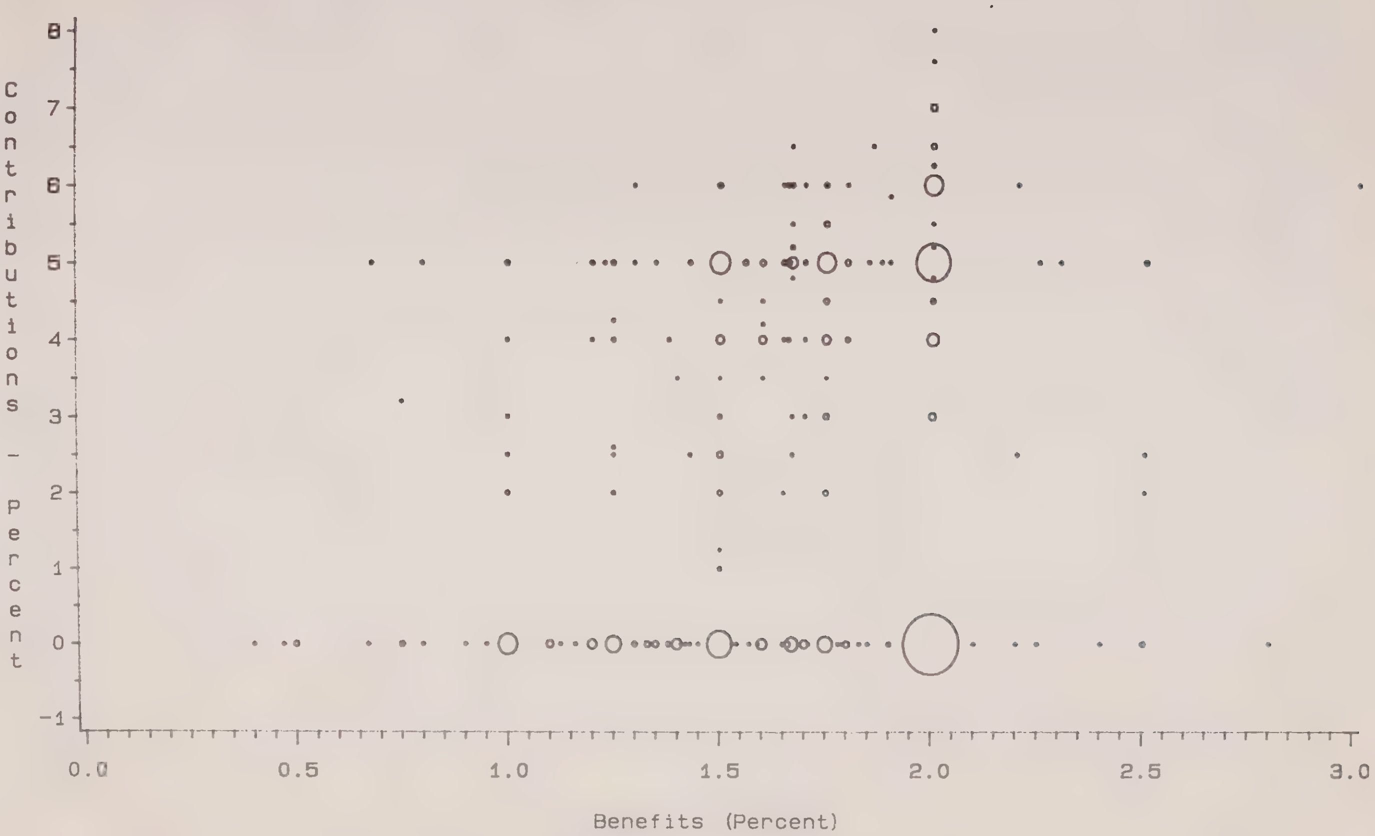
Final Average Plans



Area Proportional to Number of Plans

Figure 3.b: Plans With Ontario Members, 1984

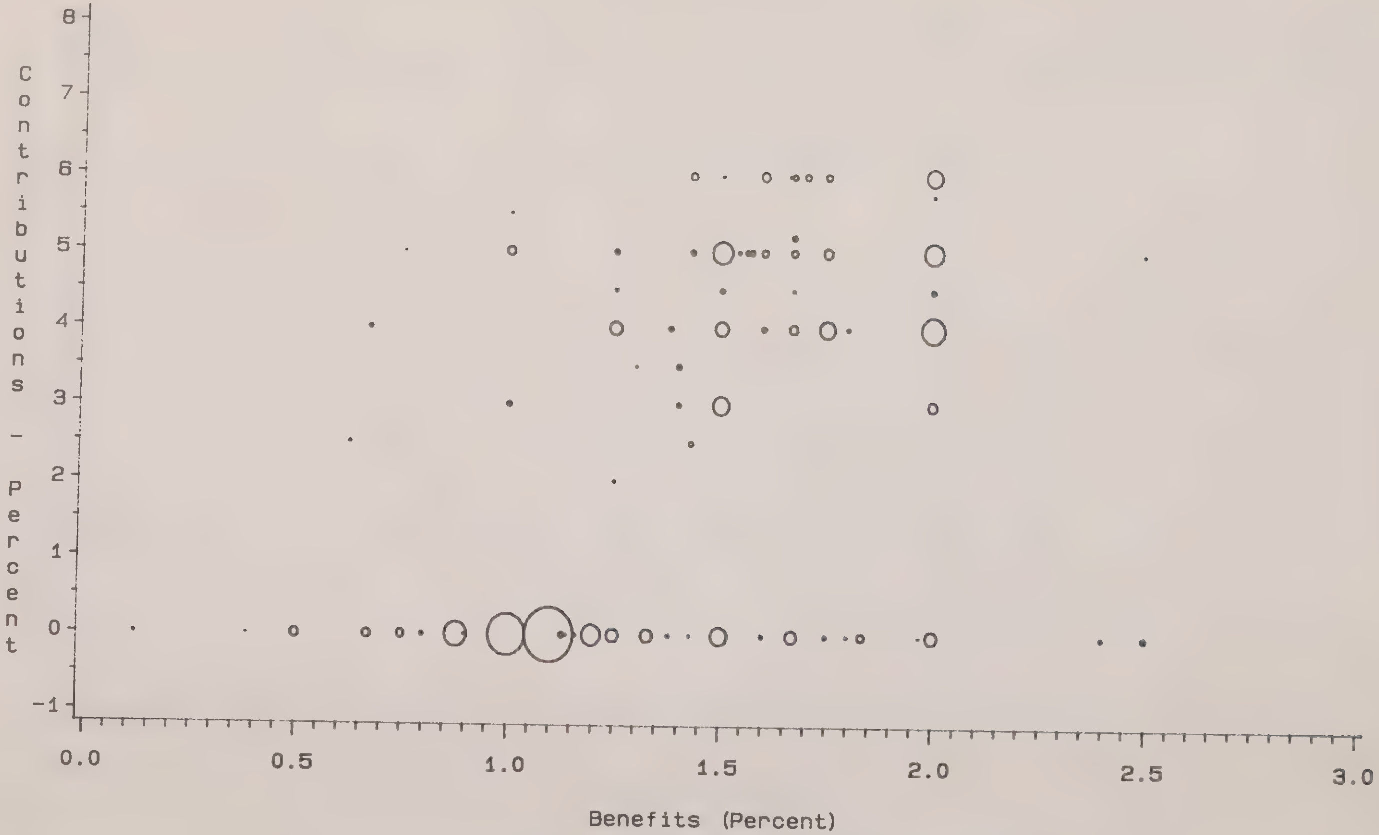
Final Average Plans



Area Proportional to Number of Plans

Figure 3.c: Plans With Ontario Members, 1970

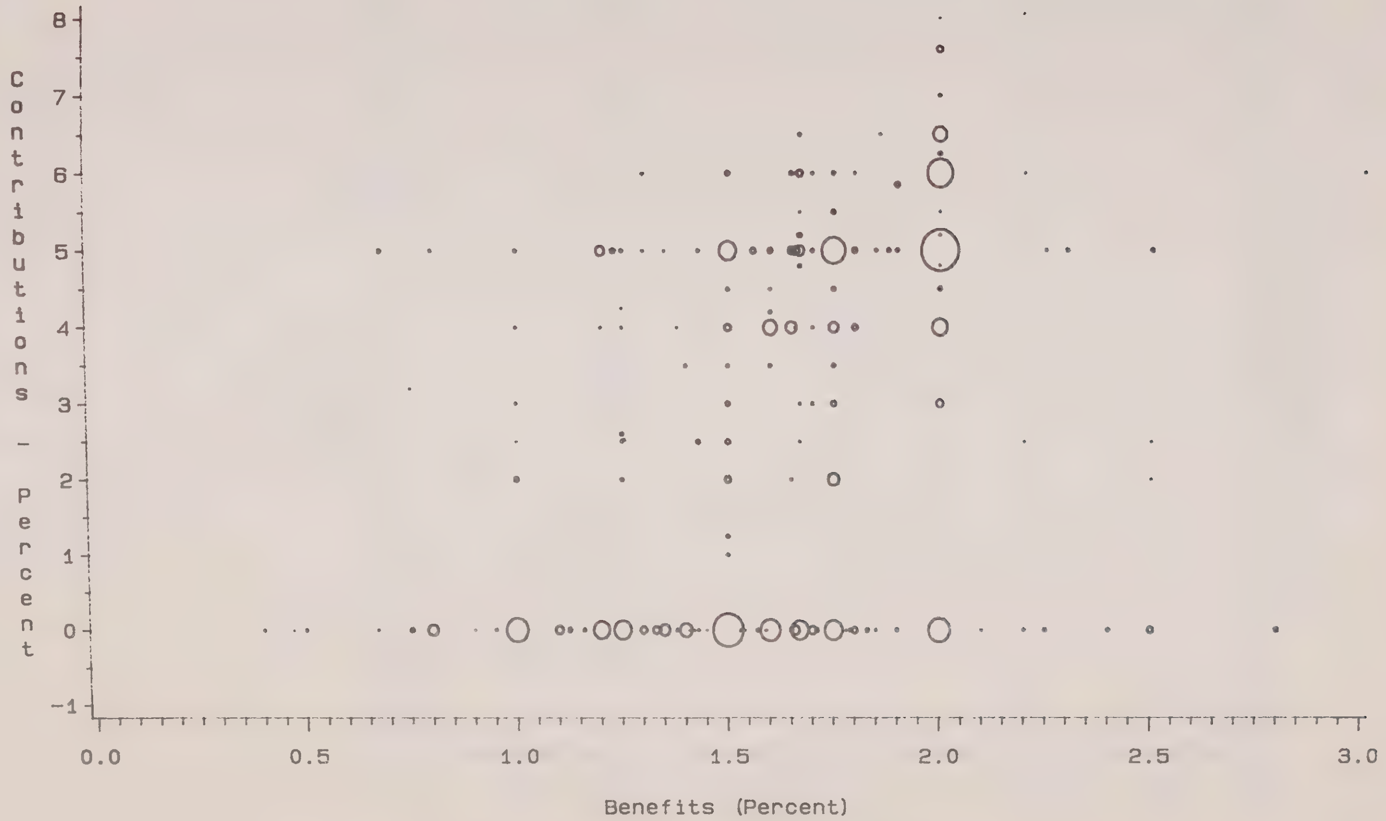
Final Average Plans



Area Proportional to Number of Members

Figure 3.d: Plans With Ontario Members, 1984

Final Average Plans



Area Proportional to Number of Members

Figure 4.a Current Service Costs
All Plans

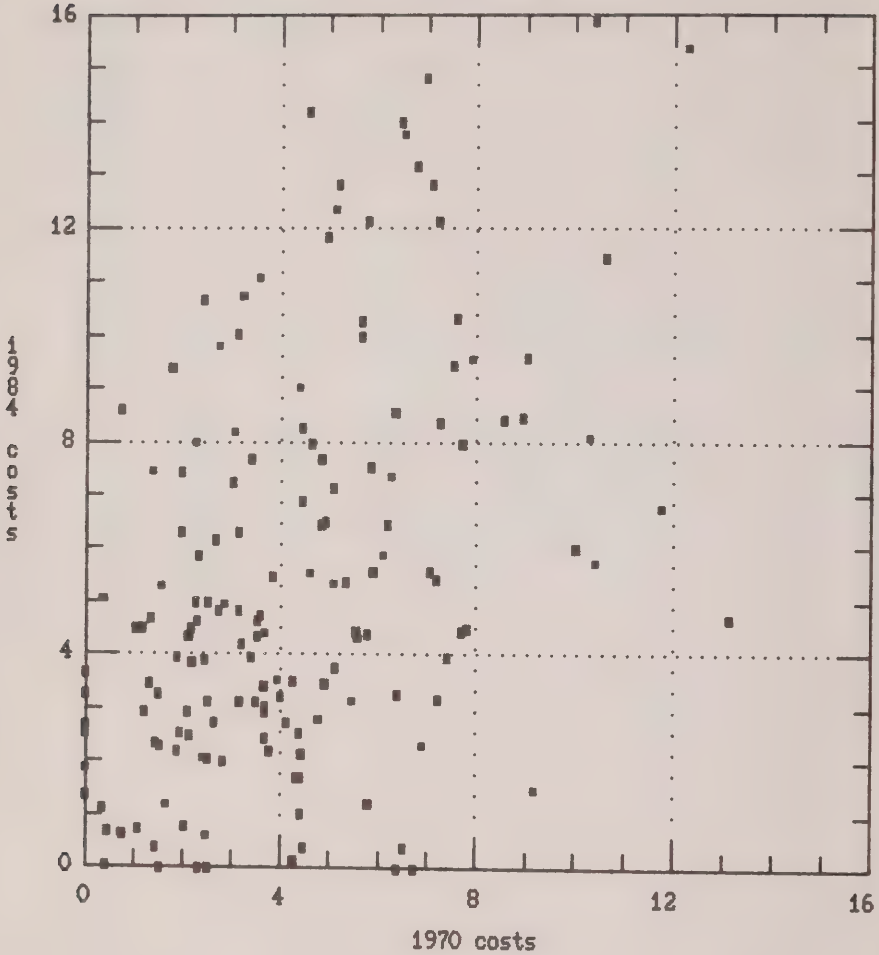


Figure 4.b Current Service Costs
Private Average Plans

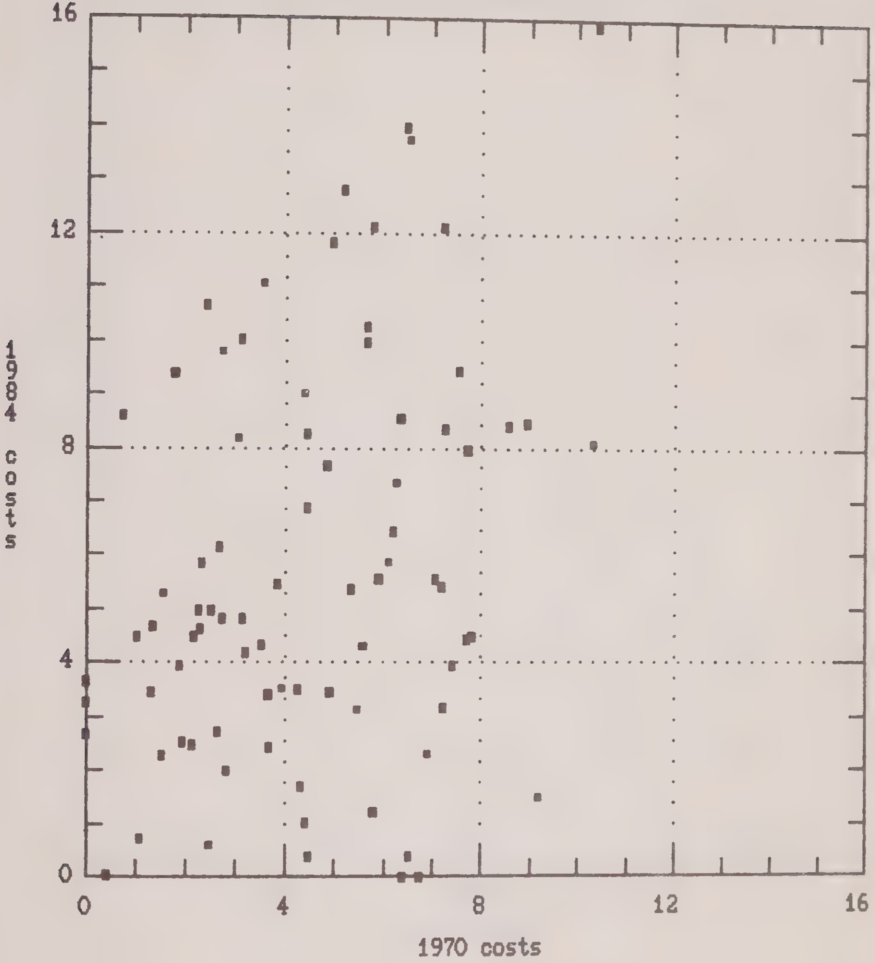


Figure 4.c Current Service Costs
Flat Benefit Plans

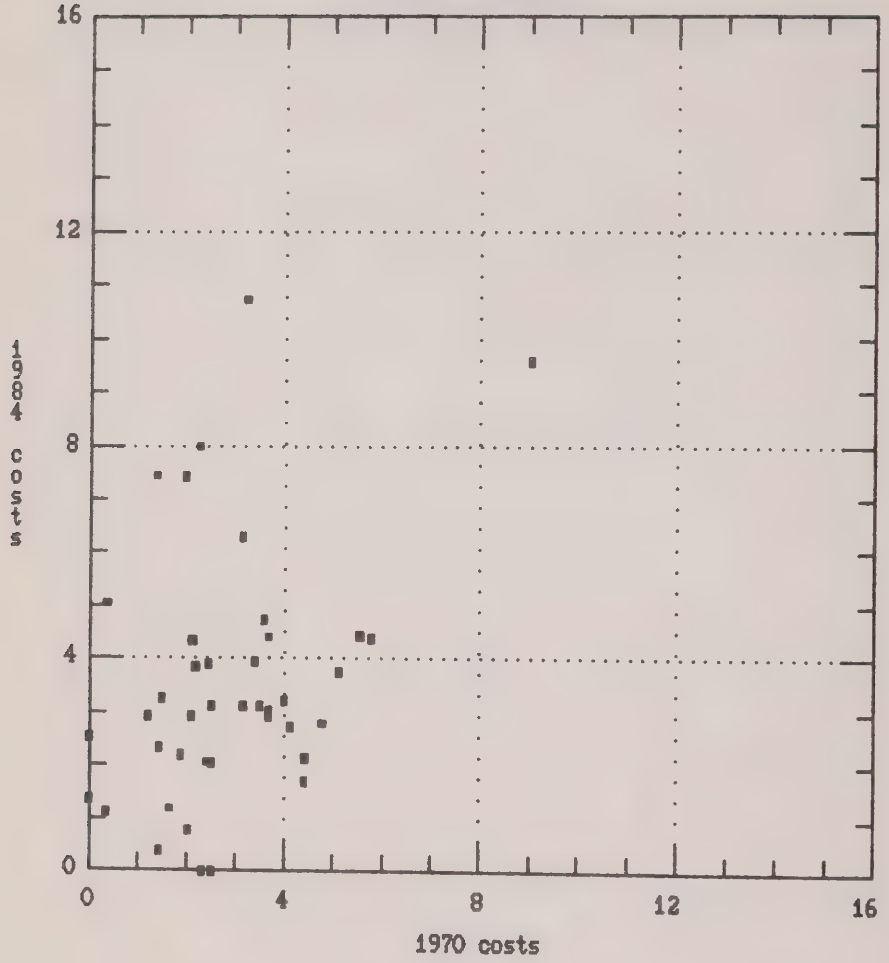


Figure 4.d Current Service Costs
Public Sector Plans

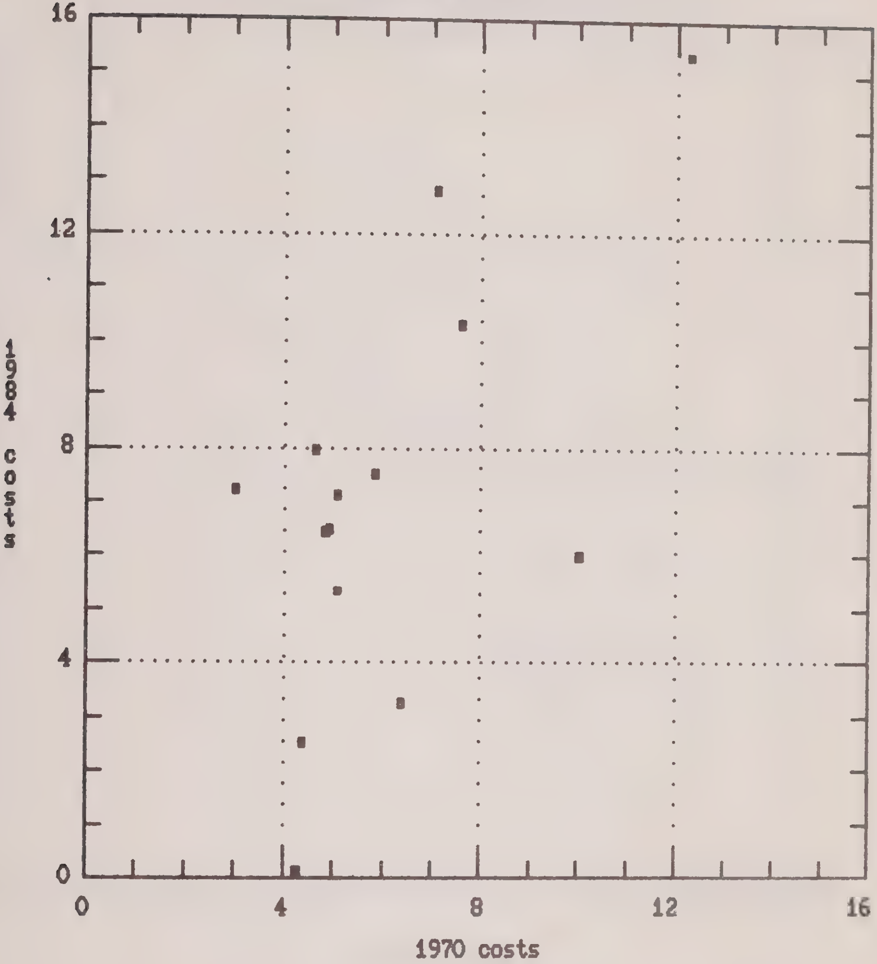


Figure 5.a Actuarial Costs, Constant Assumptions, All Plans

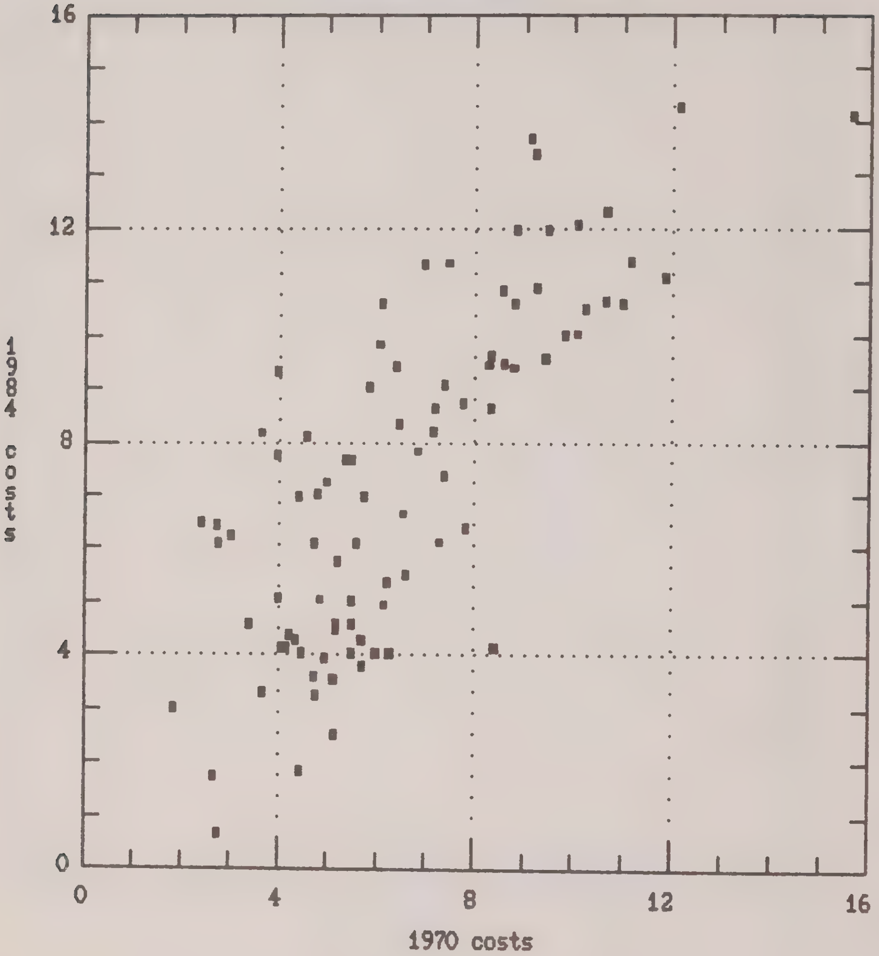


Figure 5.b Actuarial Costs, Constant Assumptions, Private Average Plans

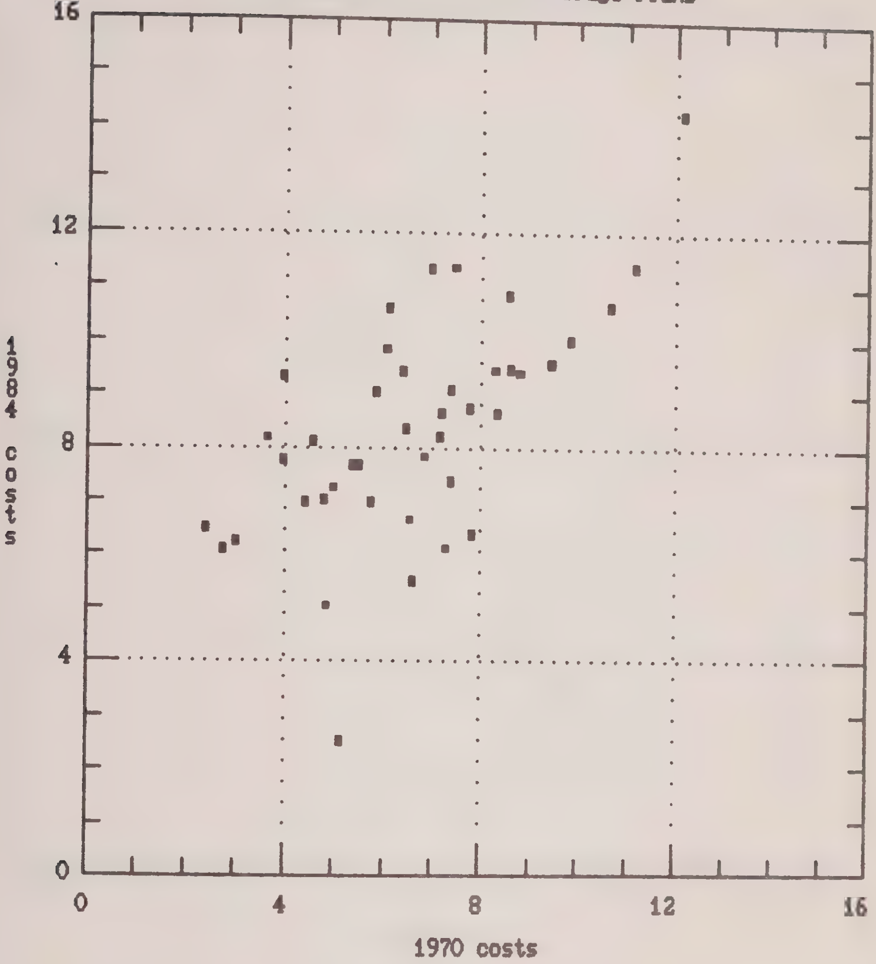


Figure 5.c Actuarial Costs, Constant Assumptions, Flat Benefit Plans

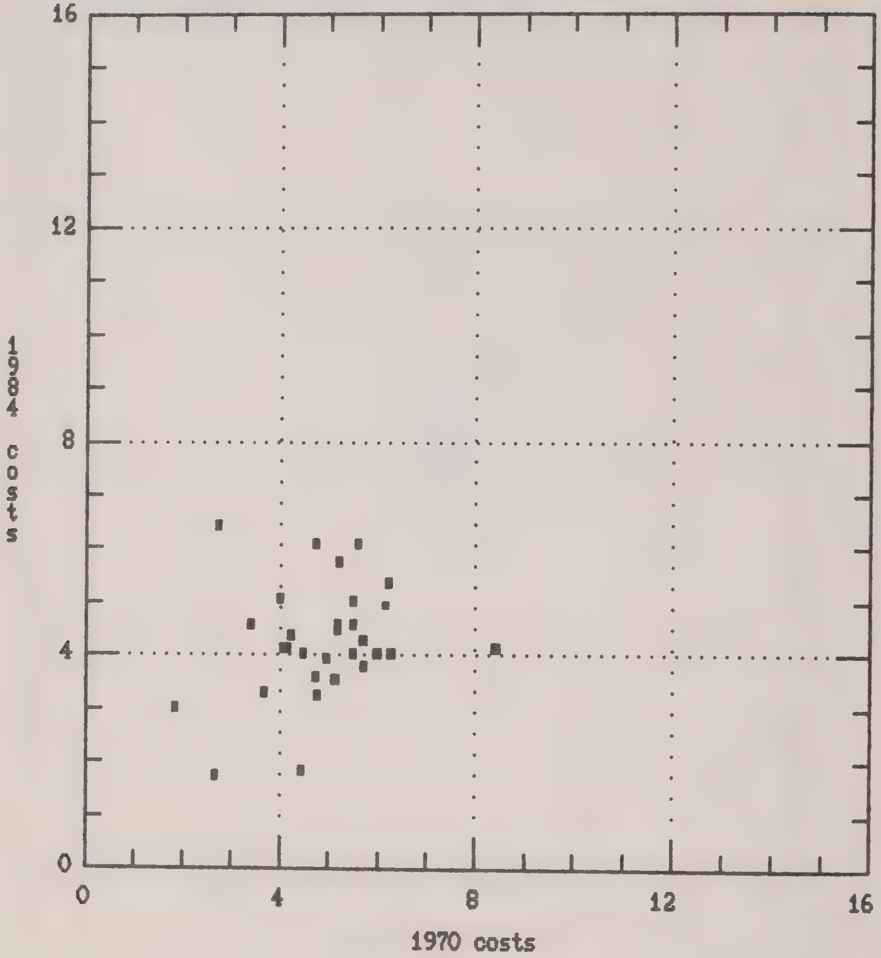


Figure 5.d Actuarial Costs, Constant Assumptions, Public Sector Plans

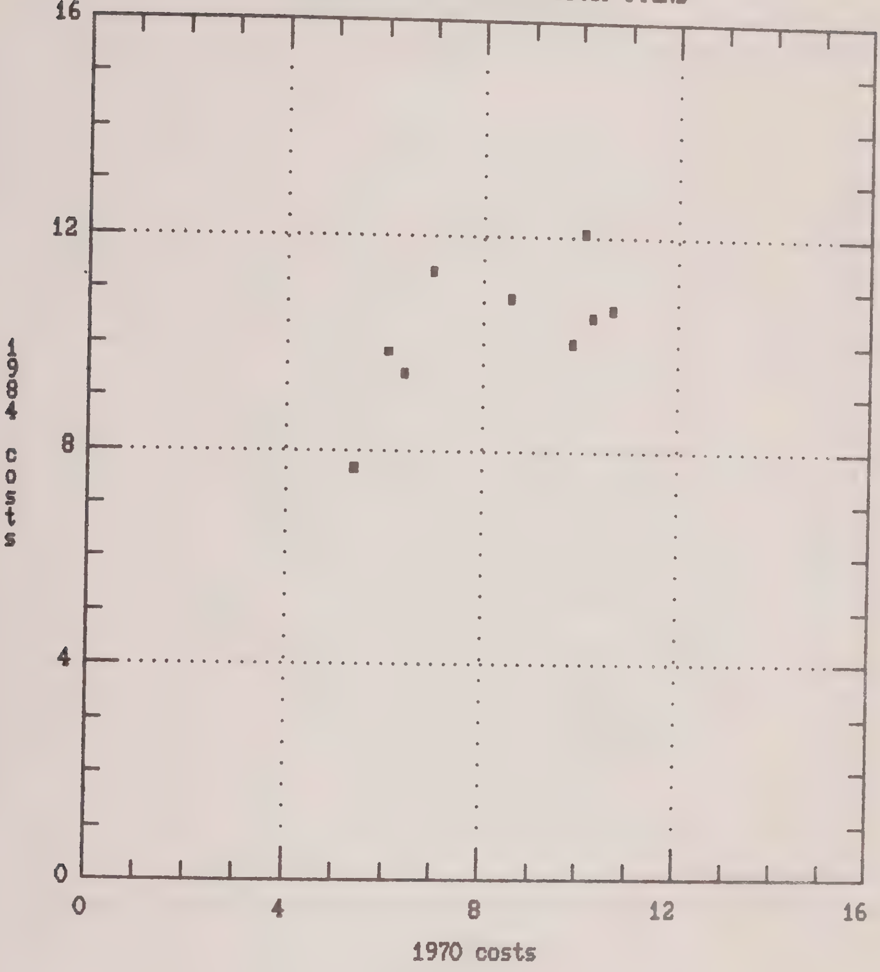


Figure 6.a Actuarial Costs, Varying Assumptions, All Plans

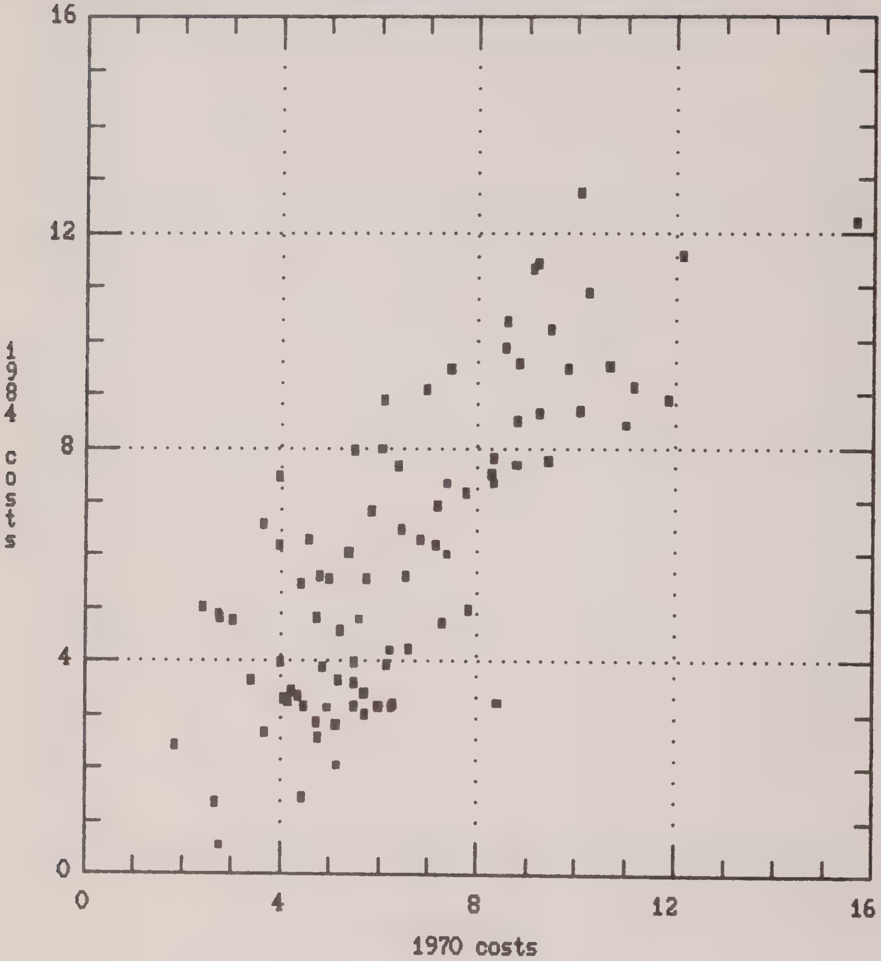


Figure 6.b Actuarial Costs, Varying Assumptions, Private Average Plans

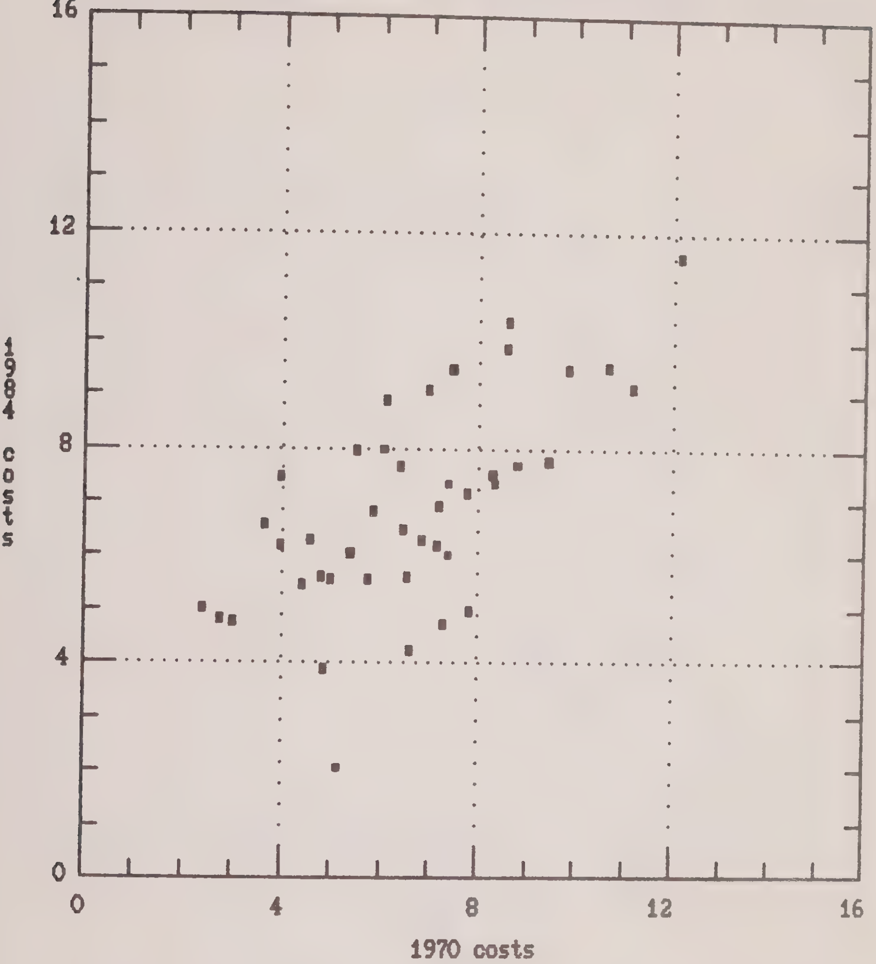


Figure 6.c Actuarial Costs, Varying Assumptions, Flat Benefit Plans

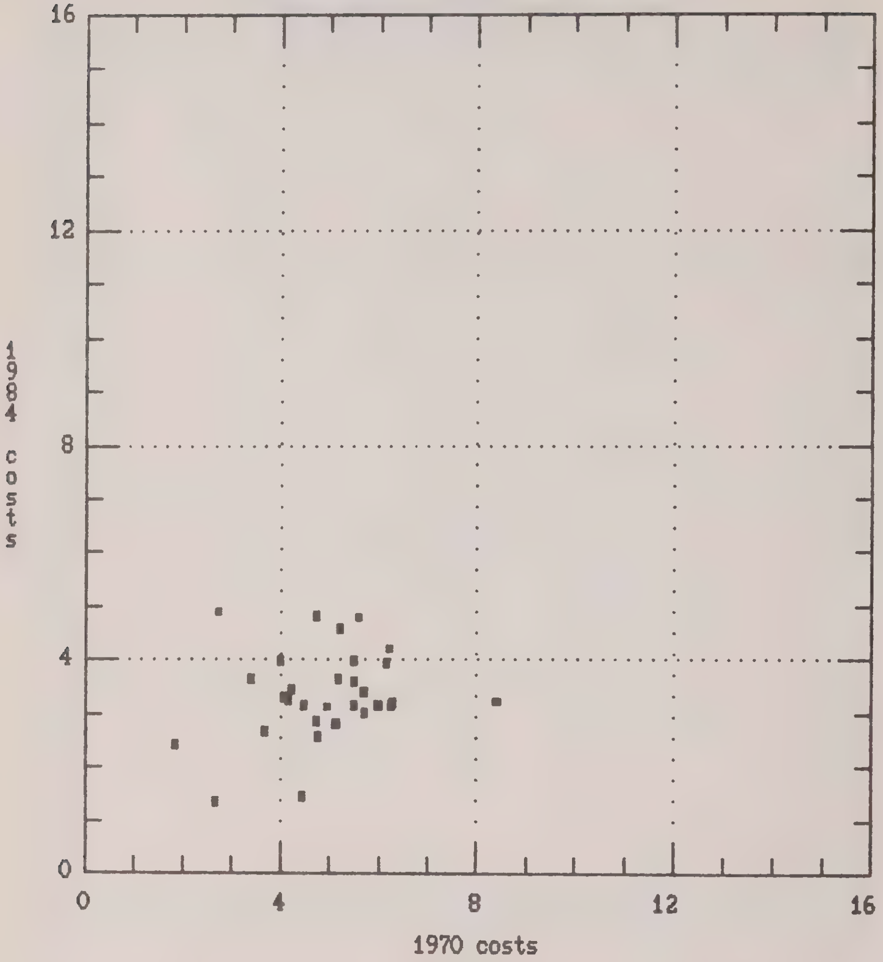


Figure 6.d Actuarial Costs, Varying Assumptions, Public Sector Plans

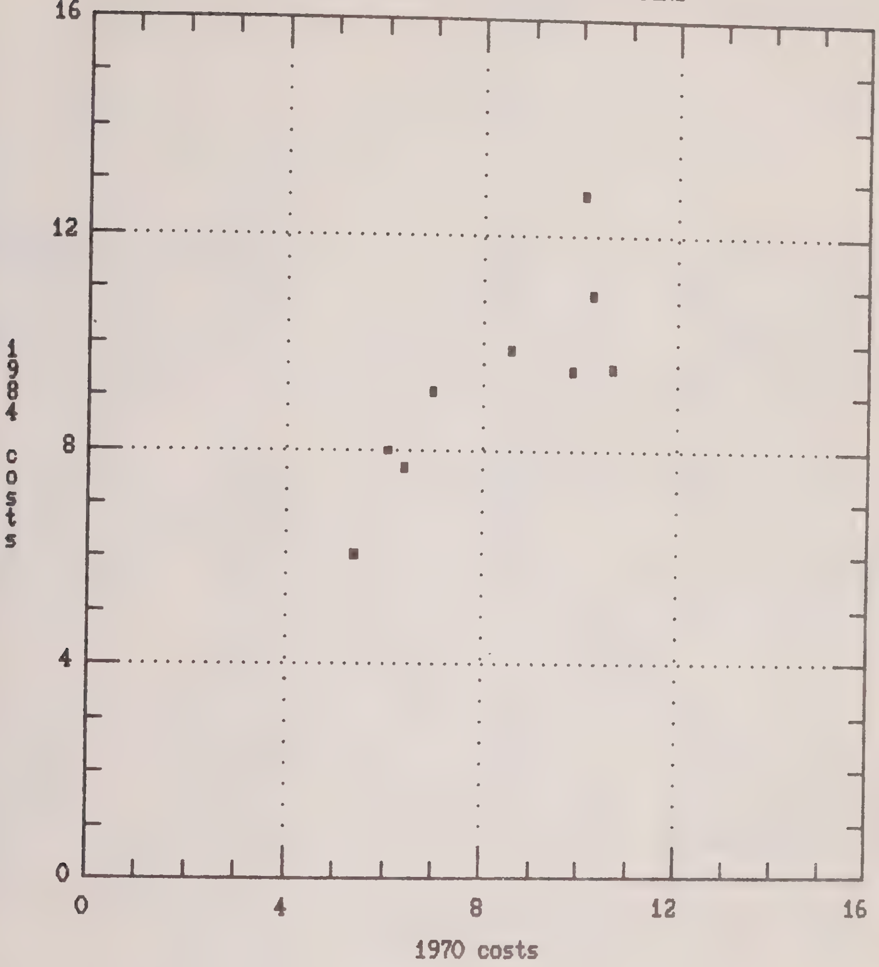


TABLE 1

ONTARIO PENSION PLANS

Jurisdiction	Plans	Members: Ontario	Members: Total
1984:			
All Canada	17,711	1,786,755	4,564,623
Plans with Ontario members	9,107	1,786,755	2,822,349
Ontario *	8,752	1,458,831	1,987,271
Federal jurisdiction	348	167,800	414,456
Exempt from Legislation	7	160,124	420,622
1978:			
All Canada	15,095	1,668,897	4,193,244
Plans with Ontario members	8,667	1,668,897	2,584,757
Ontario *	8,379	1,364,238	1,825,358
Federal jurisdiction	282	147,265	379,450
Exempt from Legislation	6	157,394	379,949
1970:			
All Canada	16,137	1,222,116	2,822,336
Plans with Ontario members	8,685	1,222,116	1,989,306
Ontario *	8,485	967,548	1,329,922
Federal jurisdiction	194	115,087	303,715
Exempt from Legislation	6	139,481	355,669

* i.e. not federal jurisdiction and not exempt from legislation.

TABLE 2

OVERVIEW OF ONTARIO PENSION PLANS BY TYPE

Type of pension plan	Number of plans			Ontario members		
	1970	1978	1984	1970	1978	1984
'Pure' Defined Benefit Plan Types						
Private sector, defined benefit						
Flat benefit non-contributory						
Single-employer	347	615	700	174,633	231,360	234,036
Multi-employer	22	57	66	21,973	62,731	113,291
Final or best average						
Contributory	311	684	741	54,869	125,009	137,462
Non-contributory	324	577	1,156	54,475	102,230	124,479
Career average						
Contributory	2,357	2,154	1,565	183,011	169,460	154,803
Non-contributory	254	364	423	47,883	67,439	74,265
Public sector, contributory, Defined benefit						
Non-indexed	19	22	26	220,485	214,150	249,900
Indexed	0	3	4	0	215,956	212,095
'Pure' private sector money purchase and profit sharing plans	4,256	3,461	3,749	58,719	102,576	88,115
Miscellaneous plan types						
Composite	205	169	134	15,623	12,841	17,688
Career average, public sector	33	23	16	86,194	20,830	15,020
Other flat benefit, $/month/year	83	76	79	28,800	28,198	28,919
Other flat benefit, $/month	93	63	30	5,573	3,953	2,716
Level percent of earnings	27	11	3	1,262	332	43
Public sector, non-contributory						
Final average or average best	*	*	*	*	*	*
Other unit benefit, private sector	28	*	4	53	*	8
Not flat benefit, multi-employer	*	*	*	*	*	*
Not elsewhere classified	124	91	52	13,468	5,227	4,812
All plans	8,485	8,378	8,752	967,548	1,364,178	1,458,831

* less than three pension plans

TABLE 3

OVERVIEW OF CHANGES IN ONTARIO PENSION PLAN NUMBERS AND MEMBERSHIP

	Distribution of members (%)			Change from 1970 to 1984			
Plan type	1970	1978	1984	Number of plans	No. of Ontario members	Per cent increase in members	Per cent of growth
Flat benefit, private							
single-employer	18.0	17.0	16.0	353	59,403	34.0	10.9
multi-employer	2.3	4.6	7.8	44	91,318	315.6	16.8
Average best, private,							
Contributory	5.7	9.2	9.4	430	82,593	150.5	15.2
Non-contributory	5.6	7.5	8.5	832	70,004	128.5	12.9
Career average, private,							
Contributory	18.9	12.4	10.6	-792	-28,208	-15.4	-5.2
Non-contributory	4.9	4.9	5.1	169	26,382	55.1	4.9
Average best, public,							
Indexed	0.0	15.8	14.5	4	212,095	*	39.1
Non-indexed	22.8	15.7	17.1	7	29,415	13.3	5.4
Sub-total, 'Pure' defined benefit plan types	78.3	87.1	89.1	1,047	543,002	71.7	100.0
'Pure' money purchase, private	6.1	7.5	6.0	-507	29,396	50.1	
All others	15.7	5.4	4.8	-273	-91,115	-53.5	
TOTAL	100.0	100.0	100.0	267	491,283	50.8	

TABLE 4

OVERVIEW OF CHANGES IN ONTARIO PENSION PLAN CONTRIBUTIONS AND BENEFITS

	Contribution rate			Unit benefit		
Pure plan type	1970	1978	1984	1970	1978	1984
Flat benefit, private						
single-employer				$4.82	$8.53	$10.91
multi-employer				3.57	12.56	16.16
Average best, private,						
Contributory	4.77	4.77	4.92	1.72%	1.79%	1.84%
Non-contributory	*	*	*	1.12	1.33	1.49
Career average, private,						
Contributory	4.66	4.68	4.59	1.79	1.91	1.95
Non-contributory	*	*	*	1.36	1.26	1.44
Average best, public,						
Indexed	*	7.00	7.00	*	2.00	2.00
Non-indexed	5.76	6.39	6.42	1.99	2.00	2.00
Money purchase, private	4.67	4.52	4.47	*	*	*

* Not applicable

TABLE 5 (A)

TRANSITION MATRIX FOR ONTARIO PENSION PLANS, 1970 TO 1984, NUMBER OF PLANS

		Continuing plans													
		1984 Plan type										Total contin-uing	Of which type change	Total deaths since 1970	Grand total for 1970
1970 Plan group type		1	2	3	4	5	6	7	8	9	0				
Flat benefit, private															
Single-employer	1	195	0	*	7	7	*	0	0	0	11	225	30	122	347
Multi-employer	2	0	*	0	0	0	0	0	0	0	*	17	*	5	22
Average best, private															
Contributory private	3	0	0	161	36	7	*	0	*	*	3	212	51	99	311
Non-contributory, private	4	3	0	6	150	*	0	0	0	*	*	165	*	159	324
Career average, private															
Contributory	5	25	0	172	64	773	59	0	*	93	*	1,207	434	1,150	2,357
Non-contributory	6	8	0	3	42	*	92	0	0	5	*	153	61	101	254
Average best, public, contributory															
Fully indexed	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Not fully indexed	8	0	0	*	0	0	0	0	9	0	0	15	6	4	19
Money purchase & profit sharing	9	18	*	32	15	77	13	0	*	1,107	9	1,277	170	2,979	4,256
Other	0	15	*	21	31	19	6	0	6	11	133	244	111	351	595
Total continuing plans		264	22	401	345	888	174	*	*	1,219	181	3,515	880	4,970	8,485
Of which no type change		195	15	161	150	773	92	0	9	1,107	133	2,635			
Of which type change		69	7	240	195	115	82	*	*	112	48	880			
Total births since 1970		436	44	340	811	677	249	*	*	2,530	141	5,237			
Grand total for 1984		700	66	741	1,156	1,565	423	4	26	3,749	322	8,752			

* One or two plans, or the adjacent cell with the smallest number of plans

	Number of plans	
	1970	1984
Continuing plans	3,515	3,515
No type change	2,635	2,635
Type change	880	880
Deaths since 1970	4,970	-
Births since 1970	-	5,237
Total plans	8,485	8,752

TABLE 5 (B)

TRANSITION MATRIX FOR ONTARIO PENSION PLANS, 1970 TO 1984 NUMBER OF PLANS WITH OVER 1,000 MEMBERS IN 1970 OR 1984

		Continuing plans													
		1984 Plan type													
1970 Plan group type		1	2	3	4	5	6	7	8	9	0	Total contin -uing	Of which type change	Total deaths since 1970	Grand total for 1970
Flat benefit, private															
Single-employer	1	*	0	0	0	*	0	0	0	0	*	30	*	3	33
Multi-employer	2	0	*	0	0	0	0	0	0	0	0	6	0	0	6
Average best, private															
Contributory private	3	0	0	14	*	*	*	0	*	0	0	20	6	2	22
Non-contributory, private	4	0	0	*	9	0	0	0	0	0	*	12	3	3	15
Career average, private															
Contributory	5	*	0	6	4	21	*	0	0	0	3	38	17	5	43
Non-contributory	6	*	0	0	4	0	9	0	0	0	0	14	5	0	14
Average best, public, contributory															
Fully indexed	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Not fully indexed	8	0	0	*	0	0	0	*	6	0	0	11	5	0	11
Money purchase & profit sharing	9	*	*	0	0	0	0	0	0	*	0	7	*	0	7
Other	0	*	*	*	*	*	0	0	*	0	12	24	12	1	25
Total continuing plans		33	8	25	23	25	12	*	11	*	17	162	52	14	176
Of which no type change		*	*	14	9	21	9	0	6	*	12	110			
Of which type change		*	*	11	14	4	3	*	5	0	5	52			
Total births since 1970		7	14	6	5	4	3	0	0	*	*	44			
Grand total for 1984		40	22	31	28	29	15	*	11	*	18	202			

* One or two plans, or the adjacent cell with the smallest number of plans

	Number of plans	
	1970	1984
Continuing plans	162	162
No type change	110	110
Type change	52	52
Deaths since 1970	14	-
Births since 1970	-	44
Total plans	176	206

TABLE 5 (C)

TRANSITION MATRIX FOR ONTARIO PENSION PLAN MEMBERS, 1970 TO 1984 (THOUSANDS OF 1984 MEMBERS UNLESS OTHERWISE NOTED)

		Continuing plans													
		1984 Plan type													
1970 Plan group type		1	2	3	4	5	6	7	8	9	0	Total contin -uing*	Of which no type change*	Total deaths since 1970*	Grand total for 1984*
Flat benefit, private															
Single-employer	1	141.8	0.0	0.5	1.5	2.9	0.4	0.0	0.0	0.0	3.5	157.0	148.6	17.7	174.6
Multi-employer	2	0.0	25.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	20.5	19.7	1.5	22.0
Average best, private															
Contributory	3	0.0	0.0	51.7	8.0	0.6	1.3	0.0	13.5	0.4	0.9	47.4	33.8	7.5	54.9
Non-contributory	4	0.2	0.0	2.4	8.6	0.6	0.0	0.0	0.0	-	1.1	39.0	34.7	15.4	54.5
Career average, private															
Contributory	5	8.5	0.0	27.2	15.8	101.6	10.1	0.0	0.2	2.6	9.4	140.7	87.8	42.4	183.0
Non-contributory	6	3.4	0.0	0.1	11.3	1.0	37.8	0.0	0.0	0.3	0.1	44.5	32.0	3.4	47.9
Average best, public, contributory															
Fully indexed	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Not fully indexed	8	0.0	0.0	2.4	0.0	0.0	0.0	212.1	101.7	0.0	0.0	218.5	56.5	2.0	220.5
Money purchase & profit sharing	9	4.8	2.5	2.3	0.7	3.4	2.4	0.0	0.4	36.6	1.3	34.0	25.2	24.7	58.7
Other	0	3.3	2.8	5.9	20.8	8.1	0.6	0.0	133.0	0.1	39.8	137.9	50.2	13.6	151.5
Total continuing plans		162.0	31.0	92.3	96.7	118.2	52.7	212.1	248.8	40.0	56.7	**	488.5	128.2	967.5
Of which no type change		141.8	25.7	51.7	38.6	101.6	37.8	0.0	101.7	36.6	39.8	575.3			
Of which type change		20.2	5.4	40.6	58.1	16.6	14.8	212.1	147.1	3.4	16.8	535.0			
Total births since 1970		72.0	82.3	45.2	27.8	36.6	21.6	-	1.1	48.1	13.7	348.5			
Grand total for 1984		234.0	113.3	137.5	124.5	154.8	74.3	212.1	249.9	88.1	70.4	1,458.8			

	Number of members	
	1970*	1984
Continuing plans	839.4	1,110.4
No type change	488.5	575.3
Type change	350.9	535.0
Deaths since 1970	128.2	-
Births since 1970	-	348.5
Total plans	967.5	1,458.8

* Figures in these columns reflect number of members in 1970

** Totals are 839.4 thousand members for 1970 and 1,110.4 thousand for 1984.

- Less than 50 members

TABLE 5 (D)

TRANSITION MATRIX FOR ONTARIO PENSION PLANS, 1970 TO 1984 NUMBER OF MEMBERS IN PLANS WITH OVER 1,000 MEMBERS IN 1970 OR 1984 (THOUSANDS OF 1984 MEMBERS UNLESS OTHERWISE NOTED)

1970 Plan group type		Continuing plans												Total deaths since 1970*	Grand total for 1984*
		1984 Plan type										Total contin -uing*	Of which no type change*		
		1	2	3	4	5	6	7	8	9	0				
Flat benefit, private															
Single-employer	1	113.2	0.0	0.0	1.0	+	0.0	0.0	0.0	0.0	+	119.6	115.2	3.6	123.1
Multi-employer	2	0.0	22.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.4	15.4	0.0	15.4
Average best, private															
Contributory private	3	0.0	0.0	33.9	3.3	+	+	0.0	13.5	0.0	0.0	30.8	21.2	2.2	32.9
Non-contributory, private	4	0.0	0.0	+	21.1	0.0	0.0	0.0	0.0	0.0	+	24.5	21.3	12.1	36.6
Career average, private															
Contributory	5	+	0.0	11.6	8.1	39.0	+	0.0	0.0	0.0	7.4	62.2	37.9	7.4	69.6
Non-contributory	6	+	0.0	0.0	+	0.0	29.4	0.0	0.0	0.0	0.0	32.1	26.0	0.0	32.1
Average best, public, contributory															
Fully indexed	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Not fully indexed	8	0.0	0.0	+	0.0	0.0	0.0	212.1	101.3	0.0	0.0	217.3	56.0	0.0	217.3
Money purchase & profit sharing	9	+	+	0.0	0.0	0.0	0.0	0.0	0.0	9.1	0.0	6.0	4.2	0.0	6.0
Other	0	+	+	+	17.1	4.9	0.0	0.0	133.0	0.0	32.1	118.6	41.1	5.4	124.0
Total continuing plans		120.5	25.4	52.3	54.9	46.2	34.6	212.1	247.7	9.1	42.0	**	338.3	30.7	657.1
Of which no type change		113.2	22.4	33.9	21.1	39.0	29.4	0.0	101.3	9.1	32.1	401.6			
Of which type change		7.3	3.0	18.3	33.8	7.2	5.2	212.1	146.5	0.0	9.8	443.2			
Total births since 1970		15.4	70.9	23.6	8.4	7.3	9.2	0.0	0.0	7.4	4.3	146.5			
Grand total for 1984		135.9	96.3	75.9	63.3	53.5	43.8	212.1	247.7	16.4	46.2	991.2			

	Number of plans	
	1970*	1984
Continuing plans	626.4	844.8
No type change	338.3	401.6
Type change	288.1	443.2
Deaths since 1970	30.7	-
Births since 1970	-	146.5
Total members	657.1	991.2

* Figures in these columns reflect number of members in 1970

** Totals are 626.4 thousand members for 1970 and 844.8 thousand for 1984

+ One or two plans, or the adjacent cell with the smallest number of plans (suppressed to preserve confidentiality).

TABLE 6

NUMBER AND MEMBERSHIP OF LARGE ONTARIO PENSION PLANS BY TYPE OF BENEFIT IN 1984 AND DATA QUALITY

	Deaths[a]	Continuing	Births
Private flat benefit			
Number of plans	3	41	21
Members (000s)	4	146	86
Public sector final average			
Number of plans	0	14	0
Members (000s)	0	460	0
Money purchase and miscellaneous			
Number of plans	b	22	5
Members (000s)	5	51	12
'Private average'[d]			
Number of plans	10	85	18
Members (000s)	22	188	49
All large plans			
Number of plans	c	162	44
Members (000s)	31	845	146
'Private average' well defined[e]			
Number of plans	8	42	16
Members (000s)	19	91	37
All large well defined plans[e]			
Number of plans	11	89	30
Members (000s)	27	676	77

NOTES:
[a] membership in 1970
[b] less than 3
[c] suppressed to prevent residual disclosure
[d] private sector career or final or best average, contributory or non-contributory
[e] sufficient data available to support the actuarial costing model

TABLE 7

ESTIMATED EMPLOYER DOLLAR COSTS FOR CONTINUING LARGE ONTARIO PENSION PLANS

	Costs as a Percentage of Payroll			
	Average	Lower Quartile	Median	Upper Quartile
All plans				
Current service costs				
1970	4.6	2.3	4.0	6.2
1984	5.5	2.7	4.6	7.9
Change	0.9	-1.3	0.8	3.3
Total costs				
1970	6.4	3.0	5.1	7.9
1984	8.1	4.0	6.5	11.1
Change	1.7	-1.8	1.5	5.4
All well defined plans				
Current service costs				
1970	4.4	2.2	3.7	5.6
1984	4.9	2.5	4.2	7.3
Change	0.5	-1.4	0.4	2.5
Total costs				
1970	5.7	2.8	4.7	7.3
1984	8.0	3.9	6.3	10.5
Change	2.3	-1.9	1.5	5.5
All private average plans				
Current service costs				
1970	5.1	2.5	4.4	6.5
1984	5.8	3.2	4.9	8.4
Change	0.7	-1.4	0.9	3.5
Total costs				
1970	6.4	2.9	5.4	7.8
1984	7.6	4.1	5.9	10.7
Change	-1.2	-1.8	1.5	5.4
All private average well defined plans				
Current service costs				
1970	4.7	2.3	3.7	6.3
1984	5.1	2.4	4.6	8.4
Change	0.4	-1.9	0.6	2.5
Total costs				
1970	5.6	2.6	4.4	6.9
1984	7.1	3.9	5.9	9.4
Change	1.5	-1.0	1.5	5.4

NOTE: 5 outliers with fewer than fifty members in one of the years have been excluded in these statistics. There was almost no impact on the quartile or median results from excluding these outliers.

TABLE 8

SIMULATED EMPLOYER ACTUARIAL COSTS FOR CONTINUING LARGE ONTARIO PENSION PLANS[a]

	Costs as a Percentage of Payroll			
	Average	Lower Quartile	Median	Upper Quartile
All well defined plans				
Levels of costs				
1970 plans, 1970 assumptions	6.5	4.7	6.0	8.3
1984 plans, 1970 assumptions	7.3	4.5	7.0	9.6
1984 plans, 1984 assumptions	6.0	3.6	5.6	8.0
Changes in costs[b]				
1970 assumptions, 1984 vs 1970 plans	0.8	-0.8	0.5	2.2
1984 plans, 1984 vs 1970 assumptions	-1.3	-1.8	-1.3	-0.9
1984 plans & assumptions vs 1970 plans & assumptions	-0.5	-1.9	-0.8	0.7
All private average well defined plans				
Levels of costs				
1970 plans, 1970 assumptions	6.6	5.0	6.6	7.8
1984 plans, 1970 assumptions	8.4	7.0	8.3	9.5
1984 plans, 1984 assumptions	6.9	5.6	6.7	8.0
Changes in costs[b]				
1970 assumptions, 1984 vs 1970 plans	1.8	0.2	1.8	3.2
1984 plans, 1984 vs 1970 assumptions	-1.5	-1.8	-1.6	-1.3
1984 plans & assumptions vs 1970 plans & assumptions	0.3	-1.0	0.0	1.8

Notes: a. i.e. continuing well-defined RPPs with at least 1,000 members in either 1970 or 1984.

b. measured plan by plan, not in aggregate.

Source: unit credit actuarial model originally developed by Statistics Canada and the Office of Superintendent of Financial Institutions as subsequently adapted by William M. Mercer Ltd.

Inflation Protection and Interprovincial Relations

David Lametti

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Inflation Protection and Interprovincial Relations

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I INTRODUCTION

Canada has a federal system of government, with a resulting division of legislative authority between the federal and provincial governments. Regulating private pensions has traditionally fallen under provincial jurisdiction, forming part of the powers to regulate 'property and civil rights' under s. 92(13) of the Constitution Act, 1867. However, the federal government has private pensions coming under its jurisdiction by nature of the industries in which the plans exist. This allocation of power to the various provincial governments and to the federal government has resulted in differing pension legislation across Canada. Therefore, in light of the fact that there are potentially eleven Canadian governments constitutionally capable of regulating private employment pensions, it is quite clear that pension reform is an issue which cannot be approached in isolation. The history of interprovincial relations on the subject of pension reform, and on inflation protection in particular, might be useful in our understanding of how the unilateral imposition of mandatory inflation protection on private plans within Ontario's jurisdiction might be received by the other provinces and the federal government.

The study will begin in Section II with a history of CAPSA, the most important interprovincial reform initiative, in an effort to trace the progress of inflation protection as a subject of interprovincial pension reform. The third section of the study will deal briefly with the Federal-Provincial Consensus on pension reform reached in 1985, where inflation protection was dropped from the final consensus agreement reached at a political level. Finally, the fourth section will canvas some opinions from pension administrators across the country on the effects of a unilateral imposition of mandatory inflation protection in

Ontario, in an effort to speculate on how other Canadian jurisdictions in general, will react to such a step.

II CANADIAN ASSOCIATION OF PENSION SUPERVISORY AUTHORITIES (CAPSA)

With the increased regulation of private pensions by the provinces through pension legislation in the 1960s came the need for the various Canadian jurisdictions to co-operate with each other in order to ensure that private pensions could be administered effectively. Given the fact that employers and their pension plans spanned various Canadian jurisdictions occasional overlaps and other administrative problems resulted. Consequently, it was during this period that the various memoranda regulating jurisdictional questions were first drafted and signed, to a large degree ensuring the effective administration of private pension plans.

Specifically, two agreements have eliminated the necessity of multiple registration for interprovincial plans. The 'Memorandum of Reciprocal Agreement' was signed by seven provinces, including Ontario, between 1968 and 1986, and the agreement was extended in separate bilateral agreements between the various provincial governments and the federal Department of Insurance.

Since these agreements required pension authorities to regulate members in other jurisdictions, it was recognized that uniformity in pension legislation across the country was a desirable goal. Moreover, a co-ordinated effort at pension reform might best ensure future uniform improvements to pension plans. Consequently, on May 21, 1968 the Committee of Superintendents was struck. Composed of the pension superintendents of Alberta, Ontario, Quebec and the federal government, the committee's aim was to establish a pension dialogue between Canadian jurisdictions. This group of four and Saskatchewan formally became CAPSA on May 10, 1974.

A CAPSA's Goals

At its inaugural meeting, CAPSA passed its governing set Rules and Regulations. Among the stated objects of the association were the following:

> (a) to assess the legislation in force and to recommend changes to legislation or regulations to improve or clarify the programs;
>
> (b) to promote uniformity of pension supervisory legislation;
>
> (c) to co-ordinate the supervisory activities of the members of the Association; . . .[1]

The goal of promoting uniformity of pension regulation schemes was the central theme that formed the basis of all the discussions that followed the creation of CAPSA.

B How CAPSA Worked

At the primary association level, i.e. CAPSA properly so-called, each jurisdiction having a pension-regulating body or legislation, was to be represented by one member, usually the senior official of the jurisdiction's administering body, or the person controlling or supervising pension standards where such a commission did not exist.[2] All CAPSA members would in turn assume the chairmanship of the association for a period of one year.[3] The first chairman of CAPSA was Mr. Justice Gill Fortier, then President of the Quebec Pension Board. Miss Donna J. Haley was Ontario's first representative to CAPSA, and chaired the body in 1981.

At a secondary level, a sub-committee of provincial pension superintendents was formed. In reality, this sub-committee was a carry over of the Committee of Superintendents begun in 1968. The purpose of the sub-committee was to administer the day to day functions of the various regulating Acts, and to discuss pension issues as they arose.

CAPSA would bring up these issues from the sub-committee level where they were of sufficient importance to merit attention, or CAPSA could initiate reform discussion on its own.[4] In order to further investigate study topics, CAPSA could refer the discussion to a sub-committee, commission a report, or keep the discussion at the CAPSA level. Moreover, CAPSA would be open to opinions of interest groups or other bodies and would consequently hear their representations.[5]

In addition to CAPSA members, other jurisdictions considering pension legislation were allowed to send representatives to CAPSA meetings. All jurisdictions have since taken advantage of the CAPSA invitation. Manitoba and Saskatchewan began sending observers in 1976, and shortly after enacting pension legislation, joined CAPSA.[6] Newfoundland became a member with the passage of its pension legislation in 1985.[7]

The ensuing pension dialogue undertaken by CAPSA has resulted in concrete reforms being undertaken in this country. Perhaps the most important single CAPSA contribution to the process of pension reform was the 1982 document, 'A Consensus for Pension Reform'. The goal in preparing the document was to provide a model for government legislation during this period when pension reform was a top priority of several governments, 'so as to ensure that as uniform an approach as possible could be implemented . . . as and when they decided to act.'[8] The consensus document contained provisions such as the 50% employer contribution rule, two-year vesting and locking-in, disclosure requirements, coverage for part-time employees, survivor benefits and marital breakdown benefits. The CAPSA suggestions became the backbone of the future Federal-Provincial Working Group (discussed in Section III) As a result, these provisions are contained to varying degrees in the Ontario Pension Benefits Act, 1987, in present legislation in Alberta and the federal government, in the recent pension reform Bill 103 in Nova Scotia (now the Pension Benefits Act, 1987) and in Bill 55 in New Brunswick, and appear to a lesser extent in Manitoba and Saskatchewan.

C CAPSA and Inflation Protection

Over the years CAPSA has discussed inflation protection with varying degrees of intensity. Four distinct periods can be identified. The first period runs from CAPSA's inception to approximately 1980. This period was almost silent with respect to inflation protection, the issue not being a high priority element of potential reform, and therefore no suggestions to the problems caused by inflation were advanced. The second period between 1981 and 1983 marks the high water point of CAPSA's interest in inflation protection, notably through the adoption of an excess interest formula as the official CAPSA position. The period between 1983 and 1986 was again silent on inflation protection. In 1986, inflation protection was put on the table again, the stress being on a CPI-linked formula instead of an excess interest based one. This falling out of grace of the excess interest approach was parallelled in reform studies done by various levels of government, academics and private organizations.[9]

1974 - 1980: The Early Years

For all intents and purposes, CAPSA did not really begin to discuss specific reform issues until 1975. In 1975, a successful public conference was organized in which six topics for pension reform were discussed. Inflation protection per se was not discussed, though tangentially it entered into a discussion on how present indexing practices would be funded and valued.[10] Inflation protection was not included in the topics for further study identified as a result of the public conference.[11]

In the period between 1975 and 1979, no specific mention of inflation protection occurred in the minutes of the CAPSA meetings. This is not surprising since the major studies that identified inflation protection as a reform issue were not released until the late 1970s. An interesting aside does appear, however, in the minutes of the Sixth meeting held on January 29 and 30, 1976. In the discussion, it was noted that the Anti-Inflation Board took the position 'that any improvements in employee fringe benefits, including pension plans, would be taken into account as part of the compensation package'[12] and would thus come under the scope of the A.I.B. This may lend some credence to the 'deferred wages' theory, advanced by some to justify employee ownership over a pension fund's assets.

By 1980, more detailed reform proposals emerged as the 'Cofirentes +' and 'Lazar' reports had been published. The minutes of May 21 and 22, 1980 acknowledged that inflation protection was an issue canvassed by the Lazar report.[13]

1981 - 1983: CAPSA and Excess Interest

In a short period of time, inflation protection went from relative obscurity to becoming a cornerstone of CAPSA's main pension reform proposal. On May 6 and 7, 1981, inflation protection for pensions in payment, deferred pensions and active employees was specifically listed as one of thirteen items requiring a uniform approach from the various jurisdictions.[14] As the following discussion indicates, a uniform agreement on inflation protection, though generally favoured, was not to be easily reached.

Partial Consensus

CAPSA's Sixteenth Meeting was held shortly after on June 8 and 9, 1981 and was titled 'A Special Meeting to Discuss Uniform Pension Reform'. An extensive discussion focussed on inflation protection, and in particular, on the excess interest formula. In principle, according to Richard Humphrys of the federal government, and the key player in reaching the consensus, two issues were involved:

> (1) the acceptance of the concept of excess interest earnings;
>
> (2) the acceptance of the concept of a maximum pension amount over which no excess interest earnings needs be used [base rate].[15]

Debate focussed on a base rate, a guide rate, an internal or external index, and coverage of the scheme. The following passage provides the summary of discussion and the partial consensus contained in the minutes, and is worth quoting at length because it sets out the issues and tentative solutions advanced by the excess interest approach to the problems surrounding inflation.

After extensive discussion on:

(1) whether or not a uniform adjustment should be provided to all plan members;

(2) the use of an outside index as opposed to the yield on the fund;

(3) whether two different benchmark rates should be used, i.e. one for future service credits (such as 3 - $3^1/_2$%) and one for past service credits (such as 7%), or whether a blended rate should apply to all benefits which would gradually be brought down to a real rate such as 3-$3^1/_2$%);

(4) whether assets should be earmarked for pensioners;

(5) whether it would not be preferable to spell out a minimum initial adjustment that all plans should provide such as 4% phased in until the ultimate level is reached;

(6) whether the adjustments should apply to all plan members or only to retirees and deferred pensioners;

(7) whether the funded status of the plan should be taken into account in determining the benefit adjustment;

(8) the risk to the employer of the use of an outside index, i.e. whether the employer could immunize himself;

The following was agreed to:

(a) the use of an outside index was accepted by Alberta, Manitoba, Nova Scotia, New Brunswick and the federal authorities;

(b) future service benefits would be valued at 3-$3^1/_2$%) or so and accrued benefits would be valued at 7% and excess interest earnings above those levels will be used to adjust benefits;

(c) there was a consensus to attempt to do the maximum for pensioners. At the Winnipeg meeting, there will be further discussion on the single factor approach compared with the two fixed factors approach;

(d) there was an agreement that excess interest earnings would at least apply to deferred pen-

> sioners and retirees and possibly active members of career average and flat benefit plans;
>
> (e) there was a consensus that if no additional cost is imposed on the employer as a result of the excess interest earnings requirement on accrued benefits, no funding relief over the current 15 years funding period would be provided;
>
> (f) no consensus has emerged yet on whether in case of money purchase plans, accumulated employee and employers contributions with interest should be used to provide only escalating annuities and whether the current fixed dollar pension benefit should be taken away from plan members. The Department of Insurance agreed to contact insurance companies to determine to what extent escalating annuities are being offered or can be offered by insurance companies. The general feeling was that it might be difficult to require escalating annuities at retirement from members of money purchase plans.[16]

It can be seen, therefore, that by July 8 and 9 a consensus was beginning to emerge on the excess interest formula. All the basic elements of the proposal eventually adopted were present in this partial consensus. The CAPSA representatives hoped to forward an agreement in the form of a statement or memorandum to the appropriate provincial and federal authorities and possibly to make the statement available to the public.

With the exception of Quebec, all the pension authorities present at the meeting accepted, in principle, the concept of requiring excess interest earnings to be used as protection for pensioners against inflation. Saskatchewan, not being represented at the meeting, did not have a position. British Columbia as well, was apparently in favour of an excess interest approach at that time.[17]

The province of Quebec's position requires further elaboration since it exemplifies the beginning of an approach to pension reform which manifests itself even at present. Quebec argued that it might be preferable 'to expand the QPP in order to provide inflation protection to plan members.'[18] Underlying this position was the unarticulated premise that any pension reform which resulted in higher employer costs might hinder the formation of new pension plans.

At the next meeting, the overall Quebec position on pensions was elaborated upon by M. Roland Boutin:

> . . . [T]he Quebec Pension Board did not favour the mandatory adjustment of private pensions through the mechanism of 'excess interest' savings. They would prefer a combined public and private sector approach which would require 100% indexing of total retirement income from private and public sources (QPP and OAS) not in excess of 60% of average wages and salaries . . . It was indicated that if the QPP were to be expanded to provide a benefit greater than 25% at the average wage level point (such as 37.5% as suggested in the Cofirentes Report), little need would remain with respect to mandatory inflation protection of private pension plans . . . [I]t is preferable to have a system whereby small or medium sized pensions (i.e. amounts less than say 60% of average industrial wages) would be fully indexed as opposed to having all private pension (sic) partially indexed.[19]

Quebec's position, then, was to promote the expansion of the number of private plans as much as possible, allowing indexation to be dealt with through the expansion of the QPP. This represented an approach to inflation protection which placed primacy on ensuing a large pension base. Discussions continued, as are outlined below, in an effort to bring Quebec's pension administrators into the consensus.

For this same meeting, a draft consensus document had been prepared by Humphrys. Focussing on the document, an extensive discussion on inflation protection ensued covering many of the same issues canvassed in the previous discussion. There are, however, some interesting points that came out of the discussion. The first was the suggestion that inflation protection for actives in formal or best average plans with the 'average' period not greater than ten years should be exempted from inflation protection requirements.[20] A brief discussion ensued based on whether in the case of money purchase plans and benefits taken out of locked-in RRSPs escalating annuities should be required. The group acknowledged that requiring initial payouts be lowered in favour of escalation might be 'politically difficult'. In an initial vote, the majority of the CAPSA group voted to retain escalating annuities as an option, though three unnamed jurisdictions favoured requiring escalating annuities.[21] The issue of phasing-in was also discussed with respect to the move from a modified base rate to a final base rate.[22] These discussions foreshadowed issues that remain in current investigations of inflation-protection: exempting 'good plans', the treatment of RRSPs, and phasing-in procedures.

Retroactivity

This last discussion was expanded upon when the issue of retroactivity was discussed later in the meeting. The issue of cost was identified as a major, but not necessarily the only, consideration with respect to retroactivity. The group stated that the initial base rate of 7% might already involve some degree of retroactivity when excess interest earnings higher than that rate were required to be used to adjust accrued benefits. In addition:

> The question of whether only the benefits accrued after initial qualification date would be subject to excess interest earnings adjustment as opposed to all accrued benefits was also raised. The general feeling was in favour of retroactivity of dynamic accrued benefits at least for benefits accrued after the initial qualification date.[23]

Thus it appears the consensus was moving towards at least a minimum position of prospective and retrospective inflation protection. That is, the group agreed to at least escalate by the formula future benefits and future payments of benefits already in progress.

The Consensus 'Package' Achieved

The slow process of moving towards a consensus continued with a second draft document presented on July 16 and 17, 1981. With Quebec still expressing 'major reservations' on inflation protection, the group was worried about presenting a uniform document to pension authorities. If uniformity could not be reached among CAPSA members, 'it would become proof in itself that uniformity is a goal that cannot be met.'[24] Therefore, it was agreed that dissenting views, though undesirable could be attached to a short appendix at the end of the document. On the second day of the meeting, whether to require fully insured plans to adjust their accrued benefits with inflation was discussed and there was a general, but not uniform, consensus that such plans would not be required to adjust benefits, though insured accrued benefits in trusteed plans would be required to adjust.[25]

This stress on uniformity carried into the subsequent meeting. Quebec acknowledged that 'the CAPSA document, in the minds of many, hinged very strongly on the indexation,' and Saskatchewan agreed.[26] Humphrys, arguing for the consensus he had drafted, emphasized that there had to be a coherent policy 'package' for the politicians. This 'package' characterization paved the way for a compromise to be reached. Quebec, having admitted the perceived importance of indexing in the proposal, but still having reservations about its implementation, agreed to a solution forwarded by David Stouffer of Ontario. The memorandum would be 'for the purpose of setting forth a package of desirable reform.'[27] As such, the whole package didn't necessarily have to be implemented. This principle was formally embodied in the text of the consensus in the following amendment to the package by Charles Lachance from Quebec:

> '...it would not be contrary to the spirit of the consensus that a given jurisdiction due to cost constraint, proceed to implement this package in stages.'[28]

All agreed to these amendments. Thus, the government of Quebec could theoretically implement the excess interest requirements only when it would be ready to do so, and the Quebec CAPSA members could support the consensus without necessarily contradicting their own government's policy.

After one more meeting in February 1982 during which more fine-tuning of the document occurred, 'A Consensus for Pension Reform' was released in May. The document was clearly the final product of the CAPSA consensus process. To briefly recap, the inflation protection proposals were as follows:

- excess interest method;
- base rate of $3^1/_2\%$;
- external guide rate equal to the average market yield over the previous 5 years of long-term federal government bonds;
- base rate of 7% for future increases of past service benefits;
- no application to actives in fiscal average plans where the determining pay period was less than 6 years;
- no application to past money purchase plans, though for future plans, one could opt-out of an increased annuity and purchase a level annuity.[29]

Reaction to the Consensus

The CAPSA document stimulated much discussion, in particular discussion on the excess interest formula, both in principle and in specifics. Most of the reaction was critical, though the federal Green Paper thought the proposal merited further study.

The CAPSA members were aware of the criticism. They actually went so far as to prepare a rebuttal memorandum to criticisms advanced by the actuarial consulting firm of Towers, Perrin, Forster and Crosby. Humphrys, who wrote the rebuttal, clearly was aware of the many arguments advanced against the excess interest method, including the contention that the method did not track inflation closely. In the end, it was conceded that the document was a discussion document, and that if it were to be rejected, 'there [had] to be an alternative, not simply a vacuum'.[30]

By way of historical analogy, the rebuttal, and the subsequent dismissal of criticism at the CAPSA meeting on September 29, 1982, might be entitled 'CAPSA's last stand'. The excess interest method was widely discussed, but with the passage of time and the fundamental nature of the criticisms which were being advanced, the excess interest method fell out of favour. Since the consensus on inflation protection was difficult to reach even among CAPSA members, especially Quebec, the negative reception of the CAPSA proposal was enough to cause even CAPSA members to eventually abandon the excess interest method. The politicians never warmed to the method suggested by the administrative group to the extent necessary to ensure inflation protection would be a part of pension reform legislation.

1983 - 1986

Beginning in 1983, the consensus attitude towards inflation protection became more ambivalent. D. S. Rudd from Ontario noted that the Pension Commission of Ontario had drafted some legislation 'which did not agree entirely with the CAPSA consensus . . . the Province of Ontario did not quite know what to do with the excess interest approach'.[31] This uncertainty came in spite of the Ontario Select Committee's endorsement of the excess interest approach. By

March 1, 1984, Saskatchewan and Manitoba had passed legislation which did not include many of the CAPSA recommendations. In Manitoba, a pension study done by the Pension Commission endorsed the excess interest formula. John Corp from Manitoba indicated that while Manitoba might be willing to change its legislation with respect to pension reform, on the issue of inflation protection, 'the Government was waiting for a consensus [i.e. a consensus on the Consensus] to emerge before moving in this direction'.[32]

In 1984 and 1985, inflation protection was not formally discussed at CAPSA meetings. During this time period, the Frith Task Force had recommended a CPI-based inflation protection formula, while specifically rejecting the excess interest approach. The Ontario White Paper similarly rejected the excess interest approach. It was also during this time period that the consensus thrust moved from the administrative sphere into the political sphere with the Federal-Provincial Consensus meetings. These meetings are dealt with below. Also during the same time period, as returns on pension funds began to grow and pension assets began to increase, the pension surplus issue began to appear more often in the CAPSA minutes.

Post 1986: The Emergence of CPI-Linked Formulas

When inflation protection reappeared as a topic for discussion in the minutes of October 1 and 2, 1986 it was CPI-linked formulas that were discussed. No consensus emerged from this meeting on which formula should be adopted. Many of the often-heard arguments against mandatory inflation protection reappeared. For example, Quebec's representative, Michael Sanschagrin, again reiterated the traditional Quebec position that widening pension coverage was more important than providing inflation protection.[33]

The most important development was that Ontario, with its commitment in the Ontario Pension Benefits Act, 1987 towards inflation protection, was now being watched closely by the other provinces. The Minister in Newfoundland, according to Tim McGrath, Newfoundland's Pension Superintendent, is reported to have asked 'if Ontario is doing it, why are we not?'[34]

It appears, on a survey of the most recent government legislative proposals and Acts, that the excess interest approach advocated by CAPSA is dead. It further appears that the CAPSA forum has been replaced in importance by federal-provincial meetings and individual governments as the primary vehicle for reform proposals and uniformity initiatives. CAPSA must be commended, however, for its consensus proposals, the majority of which have been generally accepted. Moreover it deserves credit for its promotion of uniformity as a goal, for its use of compromise as a method for achieving consensus positions, and finally, for advancing the discussion with respect to inflation protection.

Although CAPSA's excess interest approach ultimately was rejected, the group nevertheless helped to identify the issue and its complexities in an atmosphere geared towards finding a workable solution outside the political realms of the legislature and workplace. In reaching a compromise solution, a study of CAPSA illustrates not only the difficulties associated with reaching a consensus position, but also the fragility of any type of compromise solution.

III WORKING GROUP OF FEDERAL-PROVINCIAL PENSION OFFICIALS

As an agent of pension reform, CAPSA was ostensibly replaced in August of 1983 by the Working Group of Federal-Provincial Officials. At that time during a meeting of the premiers, it was agreed that 'provincial ministers responsible for pension reform should meet to develop a common understanding of the implications of pension reform. Ontario's Treasurer was asked to arrange and chair the meetings'.[35] The de facto composition of the working group was basically the same as that of CAPSA, specifically, senior pension officials from each province. These officials, however, were now working under the direction of their respective ministers. Consequently, pension reform as a process was how more overtly tied to the political process.

There were nine participating jurisdictions. Prince Edward Island and British Columbia did not participate, neither having nor contemplating pension legislation at that time. New Brunswick was among the nine since it proposed to draft model legislation based on the consensus and has since done so.[36] The primary impetus for reform came from Ontario, not only through its chairing of the sessions, but also through its White Paper and draft model legislation drawn up by the PCO,[37] which became the focal points for the reform initiative.

A Inflation Protection Absent

On June 5, 1984, fourteen pension issues received approval in principle, with 'technical details to be settled'.[38] On December 3, 1984, 'near consensus' was reached on six outstanding issues.[39] Mandatory inflation protection, 'because of its cost and complexity' was not part of the Federal-Provincial Consensus, despite the official public support advanced for it by the Ontario government.[40] According to an Ontario Background Document, this failure to include mandatory inflation protection let the consensus fall short of the full objectives of the government of Ontario. Clearly the province of Quebec's long-standing reluctance with respect to inflation protection was now shared by other jurisdictions whether in private or in public. Due to cost uncertainties and business reaction, the issue was deemed to be in need of further study. The government of Ontario therefore took the position that inflation protection should not be included in its new pension reform Bill for the following reasons:

> - [N]either the business community nor any other jurisdictions supports mandatory inflation protection.
> - If the government proceeded to unilaterally legislate inflation protection, it would be criticized for imposing significant additional costs on the province's employers and abandoning the overall goal of uniformity of pension legislation.[41]

By the fall of 1985, the consensus was in place, and draft model legislation had been developed. Ontario's Pension Benefits Act, 1987 was based on this draft.

In general, the Ontario government viewed the consensus as a positive document representing a uniform position by governments in the pension area. Further, Ontario's leadership role in the area of pension reform was reaffirmed throughout the process. This vanguard position, in addition to Ontario's dominant numerical position with respect to plan members and sponsors located within its boundaries, came about as a result of the major studies previously done in Ontario which were 'instrumental' in reaching the consensus[42] and made Ontario the pivotal province in accepting the consensus. Other jurisdictions were said to be waiting for Ontario's new Pension Benefits Act before implementing their own reform bills.[43]

IV ONTARIO'S UNILATERAL IMPOSITION OF MANDATORY INFLATION PROTECTION

The inclusion of s. 54 in the Ontario Pension Benefits Act, 1987 and a commitment to mandatory inflation protection 'broke' the federal-provincial consensus to the extent that mandatory inflation protection was unilaterally accepted in principle by Ontario. The Federal-Provincial Consensus recognized the complexity and cost of the reform, and deferred it for further study. The province of Ontario has, in a sense, not breached this part of the consensus in that it has undertaken 'the further study' required to sort out the complex issues involved, with the creation of the Friedland Task Force.

It is difficult to predict how the different provinces would react to Ontario's unilateral imposition of a mandatory inflation protection regime. The issue is now less directly important to the Task Force since the acceptance, in principle, of mandatory inflation protection in the Pension Benefits Act, 1987 has theoretically moved the focus of the Task Force from a discussion on the benefits of an inflation protection scheme in principle to an inquiry on the best method of implementation of the principle itself. All of the consequences of provincial reactions to inflation protection in Ontario will now fall squarely on the government of Ontario. To a large extent, however, the reaction of other provinces will vary with the formula adopted, its costs, retroactivity, etc., and consequently, probable provincial reaction remains of some indirect importance to the Task Force.

Several specific opinions received on inflation protection by the Task Force from pension officials in Canada indicate that reaction will vary. Emilian V. Groch, Superintendent of Pensions in Alberta and present Chairman of CAPSA, noted that Ontario as of January 1, 1985 supervised some 1,200 plans covering about 47,000 Alberta employees. Alberta supervised plans covering about 17,000 Ontario members. Groch felt that given the uncertain impact on these members, inflation protection should not be mandated. He gave five justifications -- more regulation and higher costs, no help for those without private pensions, the potential shift to defined contribution plans, disincentive to create new plans, and unfair treatment of 'good' employers -- as reasons why mandatory inflation protection should not be mandated. His position is consistent with that manifested in the Alberta pension reform document in 1984.[44]

On a technical note, it is incorrect to suggest that the 47,000 plan members employed in Alberta, but supervised in Ontario, might be covered by Ontario's legislation. According to pension legislation and the reciprocal agreements, only pension plan members employed in Ontario would be covered by Ontario regulations, though the Alberta Pensions Branch would have to regulate the 17,000 Ontario plan members using the legislative formula eventually adopted in Ontario.

Michael Cohen, Director of the Pension Benefits Division, Office of the Superintendent of Financial Institutions Canada, provided an extensive opinion that is worth quoting at length:

> While uniformity has been the goal of pension reform over the last year it is evident that the various jurisdictions are far from having achieved absolute uniformity. Nevertheless, a very significant divergence by Ontario from other jurisdictions in regard to inflation protection would be particularly difficult for plan sponsors to live with. Indeed, in this respect non-uniformity between the federal legislation and Ontario legislation may be more damaging than that between various provincial legislations. I think it would be easier to explain why employees in Manitoba or Quebec for example did not enjoy the same benefits as employees in Ontario, but how do we explain to employees in banks in Ontario that their benefits are treated differently from trust company employees, radio station versus newspaper employees and so on. This may put intense pressure on both jurisdictions to follow suit.[45]

What is particularly important will be the 'intense pressure' on the other provinces and especially the federal government to follow suit. Cohen went on to note that industry reaction might be 'irrational' based on 'philosophic rather than economic criteria'. Finally, he identified the complex issues arising from the differences between employer size, plan type, funding, retroactivity and application to deferreds. He concluded that '[once] these are known, a more accurate assessment could probably be made of responses by corporations, by unions and by other interest groups'.[46] That is, the substance of the legislation will determine the reaction of interested parties.

John W. Cook, Superannuation Commissioner from British Columbia where no pension legislation exists, expressed no opinion. However, he noted that British Columbia has always relied on the studies of other jurisdictions to 'keep ahead' of the pension reform question, and was very interested in the Task Force conclusions.[47] Ideological reasons, however, make the transition from mere interest to actual legislation unlikely for the present government of British Columbia.

It also appears that the traditional approach of the province of Quebec remains the same. Its first priority is to expand pension coverage to more individuals before tackling the problem of inflation protection. Yves Slater, Director of Pensions in Quebec, noted that the new government had yet to pronounce itself on the question of inflation protection, and therefore it would have been difficult to presume its intentions.[48] However, it should seem reasonable to conclude that no pronouncement seems to reinforce the traditional approach.

One major caveat must be stated. These opinions are those of pension administrators who are not elected officials and who do not necessarily represent the views of their governments. Ultimately, it will be governments who must react to Ontario's implementation of inflation protection. Therefore, the previous exercise is by nature speculative. It appears, however, that the degree of acceptance will ultimately depend on the perceived reasonableness of the inflation protection scheme.

As a general conclusion, it is clear other provinces are again awaiting Ontario's leadership with respect to the studying of the issue. The fact that Ontario has broken the venerable consensus is less important than what the actual proposed mechanism for inflation protection will be.

V CONCLUSION

It is clear from the foregoing discussion that uniformity is one of the major motivating forces for the proponents of pension reform in Canada. It is equally clear that achieving consensus positions is extremely difficult, and even when achieved, there is no guarantee of acceptance. This latter non-guarantee of acceptance is particularly relevant to when non-government, theoretically apolitical bodies are those which reach a consensus position. In all cases, the competent jurisdictions will always have the final say on whether or not to implement consensus reforms.

Inflation protection has traditionally been the most difficult issue facing those who desire uniformity. A consensus in past was either unattainable or unsatisfactory. In light of the inability of the federal-provincial working group to reach agreement on the issue, the government must weigh the costs of breaking from one aspect of the consensus position with the benefits of protecting pensions from the negative effects of inflation. The government has, in principle, endorsed the latter. The acceptability of any inflation protection scheme will depend on how it is implemented. If the overall mechanism is reasonably well-received by plan members and sponsors, it seems likely that some type of inertia will be created for other jurisdictions in this country to follow Ontario's lead. Throughout the consensus process -- in both the CAPSA and the federal-provincial meetings -- Ontario was one of the key players. Its imposition of mandatory inflation protection will not be ignored.

In light of the fact that a consensus may never be possible on this particular issue, for various political, economic, and ideological reasons, unilateral imposition of a reasonable inflation protection scheme might be more effective in eventually bringing about uniform legislation across Canada when Ontario's economic position and historical role in pension reform are taken into account. The best way to achieve uniformity may be through exhibiting a continued leadership role on a very contentious issue.

NOTES

1. CAPSA, Minutes from the meeting of May 10, 1974, p. 2.
2. Minutes: May 10, 1974, p. 3.
3. Ibid. p. 3.
4. Minutes: September 25, 1974, p. 3.
5. Ibid. pp. 3 - 4.
6. Minutes: October 6 and 7, 1976, p. 3.
7. Minutes: February 27, 28, p. 1.
8. Michael Cohen, letter of June 30, 1987, p. 1.
9. This parallel description is outlined in Chapter 4 of the Report.
10. March 19 and 20, 1975, pp. 2 and 12.
11. Minutes: June 10 and 12, 1975, pp. 7.
12. Minutes: January 29 and 30, 1976, p. 9.
13. Minutes: May 21 and 22, 1980, p. 12.
14. Minutes: May 6 and 7, 1981, p. 11.
15. Minutes: July 8 and 9, 1981, p. 3.
16. Ibid. pp. 3 - 5.
17. Ibid. p. 3.
18. Ibid. p. 3.
19. Minutes: June 29 and 30, 1981, p. 4.
20. Ibid. p. 8
21. Ibid. p. 11.
22. Ibid. p. 9.
23. Ibid. p. 18.
24. Minutes, July 16 and 17, 1981, pp. 3 - 4.

25. Ibid. p. 11.

26. Ibid. p. 13.

27. Ibid. p. 13.

28. Ibid. p. 13.

29. CAPSA, A Consensus for Pension Reform, (1982), pp. 9 - 16.

30. R. Humphrys 'Re Criticism by TPF & C of CAPSA's Indexing Proposal', Confidential Memorandum, Department of Insurance, August 10, 1982.

31. Minutes: February 23, 1983, p. 5.

32. Minutes: November 21, 1983, p. 4.

33. Minutes: October 1 and 2, 1986, p. 10.

34. Minutes: March 11 and 12, 1987, p. 5.

35. Ontario Cabinet Committee Document on Federal-Provincial Relations, 'Approval of Interprovincial Consensus on Pension Reform, February 25, 1985.

36. Bill 35.

37. Jerry Cooper, Marie Corbett and Sydney Tucker drew up the draft.

38. Cabinet Committee Document [on Federal-Provincial Relations], p. 4. The fourteen issues were:

    1. Pensions Divisible on Marital Breakdown
    2. Sex Differentiation
    3. Plan Surpluses
    4. Flexible Retirement Age
    5. Portability
    6. Portability for Past Service
    7. Portability Vehicles
    8. Interest on Employee Contributions
    9. Benefits upon Remarriage
    10. Disclosure
    11. Employee Representation
    12. Multi-Employer Plans
    13. CPP Offset
    14. OAS Offset

39. Ibid. pp. 4 - 5. The six issues were:

    1. Full-Time Employee Membership
    2. Part-Time Employee Membership
    3. Vesting and Locking-In

4. Minimum Employer Contributions
5. Post-Retirement Survivor Benefits
6. Pre-Retirement Survivor Benefits

Alberta disagreed with the Consensus positions on vesting and 100% pre-retirement survivor benefits. The federal government also thought this latter proposal was too expensive.

40. Ibid.

41. Ontario, 'Approval of Federal-Provincial Private Pension Reform Consensus and Authorization to Introduce New Pension Benefits Act', p. 2.

42. Ibid. p. 5.

43. Ibid.

44. Emilian V. Groch, letter dated June 17, 1987.

45. Michael Cohen, letter dated June 30, 1987, p. 3.

46. Ibid. p. 4.

47. John W. Cook, letter dated June 22, 1987.

48. Yves Slater, letter dated July 13, 1987.

Assessment of Alternative Formulas for Delivering Inflation Protection

James E. Pesando

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Assessment of Alternative Formulas for Delivering Inflation Protection

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I INTRODUCTION

There are two basic formulas that could be used to deliver inflation protection to members of employer-sponsored pension plans. These are:

(1) contractual linkage to the consumer price index (CPI), in which members would receive cost-of-living adjustments linked the actual inflation rate; and

(2) the 'excess' earnings approach, in which members would receive cost-of-living adjustments based on the actual rate of investment earnings in excess of an assumed or base rate of earnings.

There are many variants to each formula. The contractual linkage to the CPI, for example, could equal 60 per cent of the inflation rate, the full inflation rate less 2.5 per cent, and so forth. The 'excess' earnings approach is even more varied. For example, plan members could receive annual adjustments equal to the return on a portfolio of Treasury bills, less a base rate of 3.5 per cent.[1] There could or could not be a cap on the adjustment equal to the full inflation rate, a different portfolio could be assumed, the base rate could be higher or lower, and so on.

The purpose of the proposed research is to evaluate the two basic approaches, as well as specific variants, from the perspective of both the plan member and the plan sponsor.

From the perspective of the *plan member*, the key questions are:

(1) What is the degree of inflation protection that is likely, *on average*, to be provided? Equivalently, what is the *expected* rate of decline in the real value of the pension benefit?

(2) How *uncertain* is this expected rate of decline?

From the perspective of the *plan sponsor*, the corresponding questions are:

(1) Over the *long run*, what will be the increase in the cost of the plan relative to the case where (i) the plan provides no inflation protection or (ii) the plan provides ad hoc adjustments equal to, say, 40 per cent of the inflation rate?

(2) How much additional risk might the sponsor bear as a consequence of the introduction of mandatory inflation protection, and how can the plan sponsor reduce or eliminate this risk *if* the plan sponsor so chooses?

One must also assess the impact on the capital market of any change in the investment incentives facing plan sponsors subsequent to the introduction of mandatory inflation protection.

There are two recent developments which also deserve attention. First, Bill C33, introduced in the House of Commons on 16 December 1986, includes revisions to the inflation protection provision in the federal public service pension plan. Bill C33 proposes to replace full and contractual inflation protection, for future service only, by a variant of the 'excess' earnings approach. The Province of Ontario will in all likelihood review this proposal, if finalized, for possible implementation for Ontario's civil service. Second, the Co-operative Housing Foundation of Canada has recently introduced Index-Linked Mortgages (ILM's). By investing pension fund reserves established for retireds or terminated vesteds in ILM's, a plan sponsor could completely hedge a fully indexed pension benefit.

II CONTRACTUAL LINKAGE TO THE CONSUMER PRICE INDEX (CPI)

A Introduction

The inflation protection accorded private pensions can be linked contractually to the CPI in a variety of ways. These include:

	Proposal	Rationale or Source
(1)	40% CPI	Approximation to ad hoc cost-of-living adjustments.
(2)	60% CPI	Proposal under review by previous Government of Ontario.
(3)	75% CPI less 1%	Provision in Bill C-90 (Government of Canada) for minimum degree of inflation protection for pensions during period of deferral if requirement that employer must purchase at least 50% of the benefit is to be waived.
(4)	100% CPI less 2.5%	Proposal for prospective inflation protection contained in Report of the Parliamentary Task Force on Pension Reform (1983).
(5)	100% CPI	Full inflation protection.

For convenience, I will categorize approaches (1) and (2) as providing partial inflation protection, and approach (4) as providing full inflation protection subject to a deductible. Approach (3) is a hybrid. Since partial inflation protection and full inflation protection subject to a deductible differ in important ways, these two approaches are analyzed separately. The approaches are analyzed first from the perspective of the plan member, who is presumably concerned with the expected rate of decline (if any) in real value of the pension, as well as the degree of uncertainty surrounding this rate of decline. The approaches are then analyzed from the perspective of the plan sponsor, who is presumably concerned with any increase in risk as well as cost relative to the status quo.

This status quo may include the provision of ad hoc cost-of-living adjustments, but is unlikely to include any contractual provisions for inflation protection.[2]

B Partial Inflation Protection

To assess the degree of inflation protection provided when the pension receives cost-of-living adjustments equal to, say, 60 per cent of the inflation rate, one must first assess the likely prospects for inflation. If inflation is expected to average 5 per cent, then the pension will receive adjustments that are expected to equal 3 per cent per year. The real value of the pension will be expected to decline at an annual rate of 2 per cent.

At present, the 'consensus' forecast is that the annual rate of inflation in Canada will average about 5 per cent over the next decade.[3] No one, however, can predict the future rate of inflation with confidence, and any forecast of the long-term rate of inflation must be viewed as tentative and potentially subject to large error.

Two conclusions follow from the above observation. First, since one must estimate the future rate of inflation in order to estimate the expected decline in the real value of the pension, this downward 'tilt' in the stream of real pension payments cannot be estimated with accuracy or confidence. Second, because there must exist considerable uncertainty regarding the real value of the stream of pension payments, the plan member bears considerable risk on this account. If the rate of inflation were to unexpectedly increase, the real value of the pension would decline more rapidly than had been originally anticipated, and conversely if the rate of inflation were to unexpectedly decrease.

Because the future rate of inflation is inherently uncertain, so must be any attempt to cost the addition of partial inflation protection to an occupational pension plan. Further, the contribution rate for the plan will be lower, the higher is the assumed inflation rate.[4] Intuitively, this is due to the fact that the real value of the promised pension benefit is expected to decline more rapidly, the higher is the assumed inflation rate.[5] If unanticipated changes in the inflation rate do not impact on the real rate of return on the pension fund, then there is no risk to the plan sponsor associated with an unanticipated rise in the inflation rate, at least with respect to inactive plan members (terminated vested workers and retireds). Indeed, plan costs would fall. If the real rate of return on the pension fund falls in response to an unanticipated rise in the inflation rate,[6] the plan sponsor will be at least partially insulated from the adverse impact on plan costs. For this reason, partial inflation protection exposes the plan sponsor to less risk than does full inflation protection subject to a deductible, as discussed below.

C Full Inflation Protection Subject to a Deductible

Suppose that inflation protection is set equal to the increase in the inflation rate less 2.5 per cent. Then 2.5 per cent per year is the maximum rate at which the real value of the deferred pension or pension in pay can decline. If the inflation rate is projected to always equal or exceed 2.5 per cent, then this is also the certain rate of decline in the real value of the pension benefit. After five years, the real value of the pension will have declined to 88.4 per cent of its original value; after 10 years, 78.1 per cent; and so on.

The fact that the maximum rate of decline in the real value of the pension is known in advance serves to reduce sharply the uncertainty regarding the real value of the pension benefit. Indeed, if the inflation rate is predicted confidently to at least equal the deductible in all future periods, then there will be no uncertainty regarding the real value of the promised stream of pension benefits.

From the perspective of the plan member, full inflation protection subject to a deductible is preferred to partial inflation protection because of the reduced exposure to inflation uncertainty and thus to inflation risk. If the inflation rate is forecast to equal 6.5 per cent, and if the pension receives partial inflation protection equal to 60 per cent of the inflation rate, the real value of the pension will be forecast to decline at a 2.5 per cent annual rate. If the inflation rate turns out to be different from its forecast value, as will invariably be the case, the real value of the pension will in fact decline at a rate other than 2.5 per cent. If the inflation rate turned out to be sharply higher than 6.5 per cent, then the actual rate of decline in the real value of the pension will be much higher than 2.5 per cent. In the case of full inflation protection subject to a deductible of 2.5 per cent, this could not happen. Since most individuals are prepared to buy insurance against 'catastrophes', this line of reasoning highlights the important limitation of partial inflation protection.

Full inflation protection subject to a deductible virtually eliminates uncertainty regarding the real value of the promised pension payments. The plan sponsor must provide a certain stream of real pension payments, albeit with a downward tilt equal to the deductible. If the plan sponsor wished to minimize risk exposure, the sponsor would hold the same portfolio as the case in which the pension received full inflation protection. If indexed bonds or mortgages were available, these could be used to hedge the pension liability. Alternatively, a portfolio of very short-term debt instruments, such as Treasury bills, could serve as an 'approximate' hedge. In order to hedge the pension liability, the sponsor would incur the opportunity cost associated with investing in a low risk, low return portfolio. Treasury bills, for example, have provided an average real return during the past 30 years of about 1.5 per cent. This is far beneath the 3 per cent (or higher) real interest rate that is typically used by an actuary to cost a pension plan.[7]

D Analysis and Conclusions

There are a number of important points in the preceding discussion which can be succinctly summarized:

(1) In analyzing inflation protection, one must focus on both the expected rate of decline in the real value of the pension as well as the degree of uncertainty regarding this rate of decline. The latter is too often ignored in public policy discussions of inflation protection.

(2) To forecast the expected rate of decline in the real value of a pension subject to partial inflation protection, one must forecast the future rate of inflation. No economist can predict the future rate of inflation with confidence, and hence no economist can predict this expected rate of decline with confidence. The rate of decline in the real value of a pension subject to partial inflation protection is inherently uncertain.

(3) With full inflation protection subject to a deductible, uncertainty regarding the real value of the pension is virtually eliminated. The maximum rate of decline in the real value of the pension is the deductible, and the actual rate of decline will equal this maximum if the inflation rate at least equals the deductible in all future periods.

(4) With full inflation protection subject to a deductible, the sponsor is committed to making a real stream of pension payments, with a tilt equal to the deductible. To hedge this risk, the plan sponsor may wish to hold a portfolio of Treasury Bills or their equivalent. The lower real return on this portfolio should be reflected in the estimated cost of providing the inflation protection.[8,9]

(5) The higher is the assumed inflation rate, the lower will be the required contribution rate under partial inflation protection. The contribution rate required under full inflation protection subject to a deductible will be unaffected, so long as the original inflation assumption exceeds the deductible.

(6) Because partial inflation protection exposes the plan sponsor to only a modest increase in risk, the case for a ceiling on the inflation adjustment linked to the performance of the pension fund is not, in my view, persuasive. Full inflation protection subject to a deductible could expose the plan sponsor to a significant increase in risk. However, the plan sponsor can contain this increase in risk by holding a portfolio of short-term debt instruments, if the sponsor so chooses. For this reason, and because of the increase in the uncertainty regarding the real value of pensions that a ceiling on inflation adjustments would introduce, I find the case for such a ceiling to be unpersuasive.

(7) If pension benefits are indeed ‘deferred wages’, so that plan members effectively ‘buy’ them by concessions elsewhere in the compensation package, then plan members will ultimately bear the cost of a mandated improvement in inflation protection, at least if such improved protection is for future service only. If improved inflation protection is made retroactive, the plan sponsor will likely bear a significant portion of this additional cost.[10]

III THE 'EXCESS' INTEREST APPROACH TO INFLATION PROTECTION

A The Economic Rationale for the 'Excess' Interest Approach

The economic rationale for the 'excess' interest approach to inflation protection is linked to what economists call the 'Fisher' equation. The 'Fisher' equation, named after economist Irving Fisher, links the nominal interest rate (r), the real interest rate (i) and the rate of inflation (p) as follows:

$$r = i + p \tag{1}$$

According to equation (1), an increase in the inflation rate will cause the nominal interest rate to rise by an equal amount, leaving the real interest rate unchanged. If the inflation rate is zero, both the real and the nominal interest rate will equal, say, 3 per cent. If the inflation rate increases to 5 per cent, then the nominal interest rate will rise to 8 per cent, leaving the real interest rate unchanged at 3 per cent. The nominal interest rate thus contains an 'inflation premium' equal to 5 per cent. If a pension fund reserve established for retired plan members were invested in interest-bearing securities,[11] 'excess' or inflation-induced investment earnings would occur, as the nominal interest rate on the fund would rise by 5 per cent. These 'excess' interest earnings represent a potential source of funds with which to finance cost-of-living adjustments to retired plan members whose pensions would otherwise decline in real terms at 5 per cent per year. If the pension plan were costed on the basis of the real interest rate of 3 per cent, the use of 'excess' interest earnings to finance these cost-of-living adjustments would impose no additional costs on the plan sponsor.

There are, however, three important - and perhaps questionable - steps in moving from the simplified 'Fisher' equation to the proposal that 'excess' interest be used to deliver inflation protection. These steps are:

(1) the assumed validity of the 'Fisher' equation, with its prediction that a rise in the inflation rate will cause nominal interest rates to rise by an equivalent amount;

(2) the implicit assumption that the distinction between expected and unexpected inflation, with its full range of implications, can be ignored; and

(3) the implicit assumption that, in the absence of inflation, the real interest rate (or real return) on a portfolio of financial assets will be relatively stable around its expected value.

As to the first issue, economists now recognize that there is no theoretical rationale for a simple relationship between the nominal interest rate, the real interest rate and the rate of inflation. Tax considerations, for example, suggest that nominal interest rates could well rise by more than the increase in the rate of inflation. Empirical evidence, however, suggests that the nominal interest rate is likely to rise at most by an amount equal to the increase in the inflation rate, and perhaps less.

Second, only the expected rate of inflation will be built into the nominal interest rate, according to the logic underlying the 'Fisher' equation. If there is an unexpected rise in the inflation rate, then the nominal interest rate will not increase, and the real interest rate (or real return) received by the lender during this period will fall. Further, with the exception of fixed-income securities with a very short term to maturity, the rise in the nominal interest rate subsequent to an increase in the expected inflation rate will lower asset prices, and thus depress real returns during the transition period. This is most apparent for fixed income-securities, where (for existing securities) there is an inverse relationship between price and the interest rate. Perhaps surprisingly, an unexpected increase in the inflation rate is also associated with a decline in the real rate of return on a diversified portfolio of common stocks. (This empirical regularity, now well-documented, invites the question of why unanticipated inflation impacts negatively on real stock returns. This question, in fact, is the subject of an expanding literature in financial economics.)

Third, the 'excess' interest approach to inflation protection is premised on the twin assumption that (1) real interest rates (or real rates of return) will be unaffected by inflation and (2) real interest rates (returns) will be relatively stable from period to period. In the previous illustration, if the 'Fisher' equation holds exactly and if the real interest rate is 3 per cent, then applying 'excess' interest earnings above 3 per cent to cost-of-living adjustments will (1) provide full inflation protection to pensioners and (2) impose no additional costs on the plan sponsor, if the pensions due under the plan had been costed at a (real) interest rate assumption of 3 per cent. If the 'Fisher' equation holds, yet real interest rates (returns) are unstable, the inflation protection may no longer be complete, and the plan sponsor may occasionally be required to bear additional costs.

Suppose, for example, that the inflation rate rises from zero to 5 per cent, and the 'Fisher' equation holds. At the same time, and for reasons not related to the rise in the inflation rate, suppose the real interest rate drops from 3 per cent to one per cent. The nominal interest rate thus rises to 6 per cent, not to 8 per cent. If interest earnings in excess of 3 per cent are used to make cost-of-living adjustments, these adjustments will equal only 3 per cent, or 2 per cent less than the rate of inflation. If the drop in the real interest rate exceeded the rise in the inflation rate, 'excess' interest earnings would be negative, and the plan sponsor would be forced to bear the costs associated with an investment return beneath the rate assumed to cost the plan. If the real interest rate had risen at the same time that the inflation rate increased, cost-of-living adjustments in excess of the assumed 3 per cent real interest rate would have provided more than full inflation protection. If the fund held fixed-income securities with intermediate-to-long-term maturities, or if the fund held equities, sharp fluctuations in price would occur, and real rates of return could exhibit substantial volatility.

With these considerations in mind, the discussion next turns to the historical data on the real rates of return on three key assets: 3-month Treasury Bills, representing short-term securities; long-term Government of Canada bonds, representing long-term securities; and the Toronto Stock Exchange Composite Index (or its predecessors), representing a diversified portfolio of common and preferred shares.

B Real Rates of Return and Inflation: An Assessment of the Historical Data

Real rates of return on Treasury bills, long-term bonds and stocks, as well as the annual inflation rate, are presented in Table 3.1 for the period 1926 to

1985. The data, made available by Towers, Perrin Forster and Crosby, are summarized for the sample period as a whole, as well as for a later sample period commencing in 1953.

For the sample period as a whole, there is a clear relationship between risk and return. Treasury Bills have the lowest real return, at 0.77 per cent, but also the least risk, as the standard deviation of the annual real return equals 4.45 per cent. Stocks have the highest real return, at 8.70 per cent, but also the highest risk, as the standard deviation of the annual real return equals 20.02 per cent. Long-term bonds have both a lower return and a lower degree of risk than do stocks.

In the subperiod 1953-1985, two observations merit note. First, the real return on long-term bonds falls beneath the real return on Treasury bills, in spite of the much greater risk of the long-term bonds. To most economists, this finding is viewed as an anomaly. The anomaly is attributed to the almost secular rise in inflation and nominal interest rates during much of this period, which combined to depress the realized real returns on long-term bonds relative to the levels that had been anticipated by investors. The presumption is that investors demand a much higher real return on long-term bonds and that, over the long run, these higher returns are likely to materialize. Second, the real return on Treasury bills is higher, and the risk of Treasury Bills is substantially lower, than the data for the full sample period would suggest. In other words, Treasury bills (and thus short-term securities in general) appear to offer a more attractive risk-return 'package' in the past 30 years or so.[12]

(i) Real Rates of Return and Inflation

The first question to address is whether, in fact, nominal rates of return do rise by an amount equal to the increase in the inflation rate. If so, then real rates of return must be uncorrelated with the rate of inflation. Inspection of the historical data suggests, however, that this is not the case. In both sample periods, real rates of return on all assets - including stocks - are negatively correlated with inflation. In the full sample period, this negative correlation is weakest for stocks (-0.17). In the subperiod 1953-1985, this negative correlation is weakest for Treasury Bills (-0.08).

(ii) Real Rates of Return and Unanticipated Inflation

A more precise problem is to identify the impact of unanticipated inflation on the real rates of return on the alternative assets. To address this question, the inflation rate was first regressed on its own past values, to determine the extent to which past inflation rates are useful in predicting the current inflation rate. These autoregressions were used to generate forecasts of the one-year-ahead inflation rate. Subtracting these forecast values from the actual inflation rate produced a measure of the unexpected inflation rate during the year.

The results, presented in Table 2, confirm that unanticipated inflation depresses the real rates of return on Treasury Bills and on long-term bonds. For the latter, the (negative) coefficient of unanticipated inflation exceeds one. This shows that the real return on long-term bonds declines by an amount greater than the unexpected rise in the inflation rate. Presumably, this reflects the tendency for investors to raise their forecasts of the inflation rate when the current inflation rate unexpectedly increases. Nominal interest rates then rise, the prices of existing bonds decline, and realized real returns are thus depressed. An unanticipated increase in the inflation rate also serves to depress the real return on stocks, although this relationship is statistically significant only in the later subperiod.

(iii) The Stability of Real Returns

If the nominal return on a portfolio in excess of a base rate is to be used to provide inflation protection, then the stability (or lack thereof) of the real return on the portfolio becomes an important issue. If 'excess' interest is to produce good inflation protection, then the 'excess' earnings so identified must track the inflation rate closely. If not, the inflation protection so delivered will not be highly correlated with the actual inflation rate, and the real value of pension payments will be quite uncertain. As previously noted, the degree of certainty regarding the real value of pension payments is, to economists, the ultimate measure of the quality of inflation protection.

Inspection of the summary measures in Table 3.1 serves to highlight an important fact. In both samples, the real rates of return on stocks and long-term bonds have been quite volatile. This fact suggests that an 'excess' interest approach, tied to a portfolio which consists of significant portions of either stocks or long-term bonds, will not provide good inflation protection. If the return on such a portfolio is smoothed - through some form of averaging-before entering the 'excess' earnings formula, then the inflation adjustments will be smoothed as well. If smoothing of market returns is adopted, the plan sponsor will bear additional investment risk, and there is likely to be some intergenerational risk sharing among different cohorts of retired plan members.

If, by contrast, the 'excess' interest approach is tied to a portfolio of short-term securities such as Treasury Bills, the 'excess' investment earnings will track the inflation rate far more closely. Because real rates of return on Treasury bills do vary, some uncertainty will remain regarding the real value of pension payments. Nonetheless, these payments will be more stable than under an alternative 'excess' interest formula which links cost-of-living payments to current portfolio performance. The cost of this relative stability will be the lower real return associated with a portfolio of Treasury Bills. In the period 1953 to 1985, the real return on Treasury Bills averaged 1.62 per cent. (In recent years, as evident from Table 3.1, real returns have been higher.) Nonetheless, it is quite likely that the observed real return on a portfolio of Treasury Bills will be significantly lower, over the long run, than the observed real return on a portfolio which includes a significant portion of stocks. To reduce risk, one must accept a lower return. There is no 'free lunch' in the capital market.

(iv) 'Persistence' in Real Treasury Bill Returns and in the Rate of Inflation: A Digression

The degree of 'persistence' in annual returns is an additional input into the assessment of the risk of alternative assets over multiyear investment horizons. If persistence exists, then an abnormally high return in a particular year will signal the likelihood of an unusually high return in the subsequent year, and conversely for low returns. This increases the risk of an asset relative to the case where there is no persistence in realized returns.

For the period 1926-1985, only the real return on Treasury Bills exhibits positive serial correlation, and hence persistence.[13] This implies that, in a multiyear setting, the degree of risk of a Treasury Bill portfolio relative to a portfolio comprised either of long-term bonds or stocks is somewhat understated by the standard deviations reported in Table 3.1.

Of considerably more importance is the persistence in annual inflation rates. For the full sample, the first order serial coefficient for the inflation rate equals 0.733. For the later subsample, this coefficient is even higher, at 0.888. Both coefficients are significantly different from zero, and indicate that the standard error of the annual inflation rate, also reported in Table 3.1, significantly understates the risks associated with an uncertain future rate of inflation. This persistence serves, in effect, to increase the risk borne by an annuitant whose pension benefit receives no inflation protection.[14] In the presence of a 'bad' draw (i.e., an inflation rate in a given year that is higher than had been anticipated), the likelihood will be that inflation will be higher than anticipated in subsequent years as well. The converse, of course, occurs in the presence of a 'good' draw (a low rate of inflation), but the basic point remains. The uncertainty regarding the real value of the promised pension payments is greater, due to the persistence in the annual inflation rate.

C Design Issues: Base Rate, Guide Rate, Floors and/or Ceilings

The base rate in an excess 'interest' scheme is the rate above which investment earnings are used to made cost-of-living adjustments. If the base rate equals 3.5 per cent, then 'excess' investment earnings are those in excess of 3.5 per cent, and so on.

The guide rate is the chosen measure of portfolio performance. If the guide rate equals 8 per cent and the base rate equals 3.5 per cent, then 'excess' earnings equal 4.5 per cent. The guide rate can be the return, perhaps smoothed, on the plan sponsor's own portfolio, or it can be the return on an external or benchmark portfolio.

These two features of an excess 'interest' approach to inflation protection have been analyzed at length.[15] The major points contained in this prior analysis are summarized below.

(i) Base Rate

(1) The lower is the base rate, the greater will be the amount of inflation protection, and the greater will be its cost. (The base rate becomes, in effect, the interest rate used to value the annuities due under the terms of the pension plan.)

(2) The base rate could be 'split', set lower for future service and higher for past service, to enable mandatory inflation protection to be introduced with some degree of retroactivity. (In its Green Paper, Better Pensions for Canadians, the Government of Canada in 1982 proposed an 'excess' interest approach in which the base rate would equal 3.5 per cent for future service and 7 per cent for past service.)

(ii) Guide Rate

(1) There are two basic criterion that the guide rate should satisfy:
  a) excess earnings generated by the guide rate should closely track the inflation rate so that the real value of pension benefits is predictable from one year to the next; and
  b) the plan sponsor should have the option, whether exercised or not, to immunize from investment risk the pension-fund reserve that is subject to excess-interest escalation.[16]

(2) If the guide rate is the (unsmoothed) return on the plan sponsor's own portfolio, then the sponsor bears no additional investment risk, but the inflation protection delivered in any given year will vary across plans and thus across retired plan members.

Assume, for simplicity, that there are no floors or ceilings associated with the 'excess' interest approach. Then the extent to which the benefits will be stable in real terms will depend upon the risk characteristics of the investment portfolio. If the portfolio consists exclusively of Treasury bills, the resulting stream of pension benefits should be fairly stable in real terms. Further, because there are essentially no capital gains or losses on such a portfolio, the use of the yield on a benchmark portfolio of Treasury bills would allow the plan sponsor to immunize by simply holding the benchmark portfolio.

If inflation protection, properly defined as the removal of uncertainty regarding the real value of pension payments, is given high priority, the guide rate should be the yield on a portfolio of very short-term bonds, variable-rate mortgages, or Treasury bills. If the guide rate included other short-term securities as well as Treasury bills, the expected real return on the shadow portfolio would probably average 1.5 to 2 per cent over the long run. If the base rate in the excess-earnings scheme is 3.5 per cent, real pension benefits would decline on average at an annual rate of 1.5 to 2 per cent and would not be subject to sharp year-to-year fluctuations.

The additional design question is whether a floor or ceiling should be incorporated into the 'excess' interest approach. A nominal floor would ensure that benefits are never reduced, even if 'excess' investment earnings are negative. In this event, the plan sponsor suffers an underwriting loss. A cumulative real ceiling would ensure that real pension benefits would not rise above their initial level. In this case, any 'excess' earnings above the amount necessary to preserve fully the real value of the pension would be banked against future investment shortfalls. Any underwriting losses would also be banked, would accumulate at a market rate of interest, and would represent a prior claim on future 'excess' earnings. Only after any accumulated losses borne by the plan sponsor were repaid would 'excess' earnings be used to enrich pension benefits.

The operation of an 'excess' interest scheme which contains both a nominal floor and a cumulative real ceiling, for alternative investment portfolios, has been analyzed elsewhere.[17] The results are quite intuitive. If the portfolio is invested exclusively in short-term securities such as Treasury Bills, and if the inflation rate is not much less than the base rate, then neither the floor nor the ceiling is likely to exert a major impact. Suppose, for example, that the expected real return on Treasury Bills is 1.5 per cent, the base rate is 3.5 per cent, and the inflation rate equals 3.5 per cent. Then the expected nominal return on the portfolio is 5 per cent, and 'excess' earnings will on average equal 1.5 per cent. This is less than the inflation rate, so the ceiling will not bind.[18] So long as the real return on Treasury Bills remains above zero, 'excess' earnings will remain positive, and the floor will not bind as well. If the real return on Treasury Bills remains relatively stable, one would not expect the floor or the ceiling to play a major role in the delivery of inflation protection. For this reason, the case for including a floor and/or a ceiling in a mandated 'excess' interest approach is not persuasive, at least if the benchmark portfolio (or the assumed portfolio chosen by sponsors in the absence of a benchmark portfolio) consists of Treasury Bills or other short-term securities.

If the portfolio holds riskier assets, such as stocks and long-term bonds, one would expect the banking provisions to come frequently into play. As a result, the plan sponsor would play an important role in underwriting the investment risk. Depending upon funding and accounting requirements, the sponsor's underwriting experience would impact on the sponsor's reported earnings. The inclusion of a floor and/or ceiling would not, of course, alter the risk-return tradeoffs in the capital market. If a floor or ceiling were included, and if the fund held risky assets, then a substantial amount of risk would be transferred from plan members to the plan sponsor.

Should a floor and/or ceiling be included in a mandated 'excess' interest approach to inflation protection? If this approach is to deliver good inflation protection, and thus to reduce the degree of uncertainty about the real value of pension payments, then the guide rate (or the own portfolio) should be invested heavily in short-term securities such as Treasury Bills. If so, the inclusion of a floor or ceiling is likely to have only a minor effect, and could thus be viewed as an unnecessary addition.

If the guide rate (or the own portfolio) reflects the presence of risky assets, then the inclusion of a floor or ceiling will assume increased importance. If the purpose of a policy initiative is to reflect existing practice, there is a case for including a nominal floor. The purpose would be to reflect the current practice of those plan sponsors who make ad hoc adjustments, as these adjustment are usually permanent. Once given, the adjustments are not subsequently reduced. If a nominal floor is in place, the argument for including a cumulative real ceiling would appear more persuasive, as it would admit to the possibility of underwriting gains as well as losses for the plan sponsor. If the purpose of a legislative initiative is to provide inflation protection per se, there is no persuasive reason for allowing the real value of pensions to increase subsequent to a period of high real returns on a risky portfolio.

D Examples of 'Excess' Interest Formulas in Current Use

Statistics Canada provides no data on the use of 'excess' interest as a means of providing inflation protection. Apparently, 'excess' interest formulas are not in widespread use in Canada (although the size of 'ad hoc' cost-of-living adjustments made by plan sponsors is likely to be influenced by the investment performance of their pension funds). The following are examples of plans which contain an explicit 'excess' interest formula:[19] (1) Queen's University; (2) Carlton University; (3) the Toronto Transit Commission; (4) the Canada Life Insurance Company; and (5) the City of Montreal.

1. Queen's University

The guide rate is set equal to the 4-year, moving-average return on the total fund. The return is the true market return on the fund, allowing for both realized and unrealized capital gains and losses. The base rate is 6 per cent. There is no real ceiling. In the past few years, reflecting the strong performance of the bond and the stock markets, the adjustments delivered through this 'excess' interest formula have significantly exceeded the inflation rate. In the past four years, pensions have been increased by 59 per cent, while the consumer price index has risen by 19 per cent. As a result, the real value of pensions subject to the 'excess' interest formula has increased by about one-third.

2. Carleton University

The guide rate and the base rate are the same as those used at Queen's University. Again, there is a nominal floor, for which there exists a special reserve fund, and no real ceiling. Pensions are increased July 1st each year, and the increases over the past 5 years are as follows:

July 1st	Increase
1982	4.39%
1983	8.71%
1984	5.78%
1985	7.84%
1986	16.14%

Because the guide rate is the 4-year, moving average return on the fund, a favourable performance of the fund in one year will 'persist' for four years. Since the performance of the fund has been high in 1984-85, 1985-86 and 1986-87, the cost-of-living adjustments are likely to exceed the inflation rate for several more years.

3. The Toronto Transit Commission

The guide rate is set equal to the interest rate earned by the fund on its fixed-income investments, with no allowance for capital gains or losses, averaged over the prior three years. The base rate is set equal to 4 per cent. There is a nominal floor, as pension benefits will not be reduced. There is also a real ceiling, as pensions increases will not exceed the inflation rate. There is, however, a carry-forward provision to subsequent years if the 'excess' interest exceeds the current rate of inflation. Past annual increases are summarized below:

July 1st	Increase
1975	2.86%
1976	3.40%
1977	4.16%
1978	4.68%
1979	5.16%
1980	6.01%
1981	6.71%
1982	7.84%
1983	8.76%
1984	5.80%
1985	4.40%
1986	4.00%
1987	4.20%

4. The Canada Life Insurance Company

The guide rate is set equal to the earnings of the General Funds of the Insurance company (as reported to Ottawa). The value of assets in the fund is amortized, so that the reported earnings are not equivalent to a true market rate of return on the fund. The base rate is set equal to 4 per cent. There is a real ceiling, with a carry-forward provision.

5. The City of Montreal

The guide rate is set equal to the average value over the past five years of the interest rate on long-term Government of Canada bonds (i.e., bonds with a term to maturity of 10 or more years) less 2 per cent.[20] The base rate is set equal to 3 per cent for retired plan members (and 4 per cent for active plan members), as part of a renegotiated benefit structure. There is no nominal floor, but there is a provision which significantly reduces the likelihood that pensions will ever be reduced. In particular, if the guide rate is less than 3 per cent, but greater than zero, there is no downward adjustment in the pension benefit. For a pension to be reduced, the 5-year, moving-average interest rate on long-term Canada bonds would have to be less than 2 per cent. This is unlikely to occur, unless the inflation rate were to turn negative. There is no real ceiling, as the 'excess' interest adjustment is allowed to exceed the inflation rate. In recent years, the 'excess' interest adjustment has in fact exceeded the inflation rate. During the period 1983 to 1985, the 'excess' interest adjustment (for retired plan members, for whom the base rate is 3 per cent) averaged 7.49 per cent, while the inflation rate averaged 4.71 per cent.

(i) Evaluation

The details of the five plans which contain an explicit 'excess' interest formula are summarized in Table 3.3. The relevant observations are as follows:

(1) None of the plans use a guide rate equal to the interest rate on short-

term debt instruments, which is required if 'excess' interest is to track the inflation rate closely.

(2) In three plans (Queen's, Carleton, and the City of Montreal), there is no real ceiling, and the real value of pensions protected through 'excess' interest has risen, in some cases sharply, in recent years. (This positive experience may raise the degree of enthusiasm of members in other plan members for adoption of the 'excess' earnings approach.)

(3) Members in the Queen's and Carleton plans, in particular, are bearing a significant amount of investment risk during their post-retirement years.

(4) In spite of the high base rate (6%) and the averaging (4 years) in the guide rate formula, the sponsors of the pension plans at Queen's and Carleton are probably underwriting a substantial amount of investment risk. In the City of Montreal and Toronto Transit Commission Plans, the sponsor cannot readily shed the investment risk created by the choice of the guide rate. (See endnote 16.)

(5) All plans have, in effect, a nominal floor, so that pension benefits are not reduced if 'excess' interest is negative. (There is a caveat to this remark with regard to the plan sponsored by the City of Montreal, as noted previously.)

E Analysis and Conclusions

There are a number of important points in the preceding discussion which can be succinctly summarized:

(1) The logic behind the excess' interest approach to inflation protection is straightforward: inflation-induced or 'excess' investment earnings from the pension fund can be used to offset inflation-induced losses in the purchasing power of the pension of inactive plan members.

(2) The 'excess' interest approach requires the specification of a guide rate, to reflect the performance of the pension fund or an external benchmark, and a base rate, which could be the expected return on the fund when there is zero inflation (i.e., the base rate could be set equal to the real

interest rate expected to be earned on the fund). Pensions are adjusted by the difference between the guide rate and the base rate. The 'excess' interest approach may also specify that pension benefits are not reduced if 'excess' earnings are negative (a nominal floor). The approach might also specify that the 'excess' earnings, even if sufficient, will not be used to increase the real value of the pensions above their initial values (a real ceiling).

(3) An assessment of the risk-return characteristics of the major categories of financial assets, here grouped as short-term bonds, long-term bonds and stocks, is the essential first step in the analysis and design of an 'excess' interest formula. The analysis in this chapter, which focuses on Treasury bills (short-term bonds), Government of Canada bonds (long-term bonds) and the Toronto Stock Exchange Composite Index (stocks), indicates that:

    (i) unanticipated inflation lowers the real rate of return on all three assets;
    (ii) only short-term bonds have a real rate of return which is sufficiently stable to provide the guide rate for an 'excess' earnings formula, if the purpose of the formula is to provide good inflation protection (i.e., to reduce significantly the uncertainty regarding the real value of the pensions of inactive plan members).

(4) The choice of the base rate will determine the cost of the inflation protection (the base rate becomes the interest rate used to value the annuities due under the terms of the plans), as well as the expected 'tilt' in the real value of pensions so protected. (If the base rate exceeds the expected real rate of return on the fund, then pension benefits will have a downward 'tilt', as their real value will on average decline by the difference in these two rates.)

(5) The argument for including a nominal floor is, in large part, to mirror current practice with regard to 'ad hoc' adjustments. If the guide rate is tied to the yield (and hence the return) on short-term bonds or Treasury bills, the inclusion of a floor may be largely superfluous. (Some may

use this observation to argue for the inclusion of a floor). If the purpose of the 'excess' interest approach is to provide good inflation protection, rather than to allow the real value of pensions to increase subsequent to a period of high real returns on a risky portfolio, there is a case for including a real ceiling. Again, the importance of this design feature will be greatly reduced if the guide rate is linked to the yield on short-term bonds.

(6) The formal use of the 'excess' interest approach to inflation protection is not common. (Many sponsors, of course, will be influenced by the performance of their pension funds in deciding the amount of 'ad hoc' cost-of-living adjustments.)

(7) This chapter reviewed the details of five 'excess' interest approaches currently in use. The most striking feature, to this author, is the discrepancy between the design suggested by economic analysis and the actual (although quite limited) experience with 'excess' interest formulas. None of the plans linked the guide rate to a short-term bond portfolio. Either the plan members (Queen's, Carleton, The Canada Life Insurance Company) or the plan sponsors (Toronto Transit Commission, City of Montreal), or both, appear to bear substantial investment risk. Every plan had a nominal floor. Three of the plans had no real ceiling, and retired members of these plans have, in recent years, received 'excess' earnings adjustments that are greater than the inflation rate (i.e., the real values of their pensions have increased).

(8) Because no 'excess' interest approach has been legislated in Canada, certain broad policy decisions have not yet been addressed. These include:

  (i) the choice of a guide rate and a base rate (and the possibility of a 'split' in the latter to facilitate retroactivity, with a higher base rate applicable for past service);
  (ii) the question of whether to impose uniformity across plans, by standardizing the guide rate and the base rate, or whether to permit the guide rate to reflect the earnings of the individual pension funds.

(9) If the public policy decision is that all inactive plan members should receive the same inflation updates, then the ‘excess’ interest approach would have to specify a common guide rate and a common base rate. If uniformity is desired, it may be simpler to opt for contractual linkage to the consumer price index.

TABLE 3.1 (a)

REAL RATES OF RETURN IN CANADA 1926-1985, BILLS, BONDS AND STOCKS

Year	3-month Treasury Bills	Long-Term Government Bonds	T.S.E. Composite (300)	Inflation (CPI)
1926	4.76	6.42	25.97	---
1927	4.56	10.84	46.61	-1.61
1928	3.03	0.39	32.34	0.00
1929	1.96	-0.07	-13.77	1.09
1930	9.74	15.62	-26.51	-0.54
1931	13.13	6.30	-25.35	-9.78
1932	10.32	21.73	-5.09	-9.04
1933	2.87	9.23	55.02	-4.64
1934	0.61	16.67	18.46	1.39
1935	-0.28	-0.96	27.88	0.68
1936	-0.26	10.64	30.80	2.04
1937	-3.25	-4.03	-25.53	2.67
1938	2.55	7.38	11.42	1.30
1939	-1.81	-4.95	4.65	-0.64
1940	-3.48	3.60	-19.50	3.87
1941	-5.71	-2.77	-7.62	6.21
1942	-2.77	-0.31	10.15	4.68
1943	-0.62	2.61	23.56	1.68
1944	1.53	4.31	19.64	0.55
1945	-0.76	3.79	40.23	0.55
1946	-5.30	-0.42	-1.28	3.26
1947	-12.59	-10.24	-12.26	9.47
1948	-7.40	-9.29	3.65	14.42
1949	-0.83	3.30	21.82	2.94
1950	-5.23	-5.58	42.76	2.86
1951	-8.97	-11.86	13.30	10.71
1952	2.74	3.91	1.64	2.15
1953	1.63	3.74	2.68	-0.70
1954	1.20	8.77	38.78	0.71
1955	1.03	-0.44	27.26	0.00

TABLE 3.1 (b)

REAL RATES OF RETURN IN CANADA 1926-1985, BILLS, BONDS AND STOCKS

Year	3-month Treasury Bills	Long-Term Government Bonds	T.S.E. Composite (300)	Inflation (CPI)
1956	-0.45	5.94	8.78	1.40
1957	1.72	4.24	-22.16	3.11
1958	-0.12	-7.43	27.91	2.68
1959	3.29	-5.00	3.21	1.31
1960	1.97	5.38	0.52	1.29
1961	2.57	8.93	32.28	0.96
1962	2.62	1.72	-8.49	0.95
1963	1.74	2.68	13.50	1.88
1964	1.93	4.67	23.19	1.84
1965	0.88	-1.64	3.56	2.41
1966	1.46	-1.45	-10.18	3.53
1967	0.39	-5.69	13.34	3.69
1968	2.26	-4.11	17.65	4.11
1969	2.35	-6.20	-5.21	4.47
1970	5.12	19.78	-4.97	3.27
1971	-1.02	6.19	2.99	2.93
1972	-1.49	-3.04	21.23	4.74
1973	-3.83	-6.46	-8.25	7.69
1974	-3.99	-11.45	-34.05	10.92
1975	-1.98	-6.04	8.15	10.80
1976	3.15	12.23	4.84	7.52
1977	-1.64	-2.98	1.15	7.92
1978	-0.06	-6.12	19.70	8.98
1979	1.43	-11.06	31.85	9.05
1980	1.73	-7.76	17.03	10.16
1981	6.24	-12.50	-19.93	12.49
1982	5.62	31.67	-3.41	10.80
1983	4.88	4.74	29.59	5.78
1984	7.49	11.72	-5.92	4.35
1985	5.31	19.82	19.84	4.01

TABLE 3.1 (c)

REAL RATES OF RETURN IN CANADA 1926-1985, BILLS, BONDS AND STOCKS

Year	3-month Treasury Bills	Long-Term Government Bonds	T.S.E. Composite (300)	Inflation (CPI)
Mean	0.77	1.88	8.70	3.41
Standard deviation	4.45	9.18	20.02	4.58
Correlation coefficients	(1)	(2)	(3)	(4)
(1) T.Bills	1.00	-	-	-
(2) Bonds	0.59	1.00	-	-
(3) T.S.E.	-0.03	0.07	1.00	-
(4) Inflation	-0.50	-0.44	-0.17	1.00
Descriptive statistics for the period 1953-1985:				
Mean	1.62	1.24	7.46	4.70
Standard deviation	2.69	9.91	17.18	3.69
Correlation coefficients	(1)	(2)	(3)	(4)
(1) T.Bills	1.00	-	-	-
(2) Bonds	0.56	1.00	-	-
(3) T.S.E.	0.02	0.05	1.00	-
(4) Inflation	-0.08	-0.21	-0.29	1.00

TABLE 3.2

REAL RATES OF RETURN AND UNANTICIPATED INFLATION

Estimated Equation: $i_t = a + b(p_t - p^*_t) + u_t$

	a	b	SEE	R^2	D.W.
Treasury Bills					
1929-1985	0.660 (1.34)	-0.841 (5.16)*	3.717	.327	0.744
1953-1985	1.619 (3.72)*	-0.751 (2.45)*	2.497	.162	0.947
Government Bonds					
1929-1985	1.747 (1.52)	-1.122 (2.95)*	8.679	.137	1.874
1953-1985	1.241 (0.79)	-3.101 (2.81)*	8.992	.203	1.885
Stocks					
1929-1985	7.618 (2.94)*	-0.404 (0.47)	19.587	.004	1.666
1953-1985	7.460 (2.62)*	-4.162 (2.07)*	16.361	.122	2.020

Notes: i_t represents the real rate of return during the year, p_t denotes the rate of inflation, and p^*_t denotes the expected rate of inflation, which is set equal to the predicted values from a regression of inflation on its two most recent lagged values. Asterisk denotes coefficient significantly different from zero at the 5 per cent level.

TABLE 3.3

EXAMPLES OF 'EXCESS' INTEREST FORMULAS CURRENTLY IN USE

Plan Sponsor	Guide Rate	Base Rate	Nominal Floor	Real Ceiling
Queen's University	4-year, moving average return on the total pension fund	6%	Yes	No
Carleton University	4-year, moving average return on the total pension fund	6%	Yes	No
Toronto Transit Commission	3-year, moving average interest rate on fixed-income investments	4%	Yes	Yes
Canada Life Insurance Company	annual earnings (net market rate of return) on General Funds of the company	4%	N.A.	Yes
City of Montreal	5-year, moving average of the interest rate on long-term Government of Canada bonds, less 2%	3% for inactives; 4% for actives	Yes	No

Note: See text for more detailed discussion.

IV HISTORICAL SIMULATIONS OF THE INFLATION PROTECTION DELIVERED UNDER THE ALTERNATIVE APPROACHES

A Introduction

The purpose of this chapter is to provide historical simulations of the alternative approaches to delivering inflation protection. This is accomplished by tracking the real value of a hypothetical pension which commences in either 1965, 1970, 1975 or 1980, and which receives inflation protection according to the indicated approach. For perspective, the real value of a pension which receives no inflation protection is also illustrated.

The results when inflation protection is contractually linked to the Consumer Price Index (CPI) are shown in Table 4.1. Four formulas are illustrated:

(1) 40 per cent of CPI;
(2) 60 per cent of CPI;
(3) 75 per cent of CPI less one per cent; and
(4) CPI less 2.5 per cent.

The results when inflation protection is delivered through the 'excess' earnings approach are illustrated in Table 4.2. Three guide rates are considered:

(1) the market rate of return (interest rate) on Treasury bills;
(2) the market rate of return on a low-risk portfolio, comprised of Treasury bills (50%), long-term Canada bonds (25%) and stocks (25%);
(3) the market rate of return on a high-risk portfolio, comprised of Treasury bills (25%), long-term Canada bonds (25%), and stocks (50%).

In Table 4.3, the 'excess' earnings approach proposed by CAPSA, in which the guide rate is the five-year, moving average interest rate on long-term Government of Canada bonds, is also illustrated. For each 'excess' earnings approach, the real value of the pension is shown for the case in which the base rate equals 3.5 per cent, and the case in which the base rate equals 7 per cent.

To many, the most useful summary measure of the success of each approach is the extent to which the real value of the initial benefit has been preserved, say, 5, 10, or 15 years after the pension has commenced. To an economist, however, this is not the only measure. As emphasized previously, economic analysis tends to equate 'good' inflation protection with removing the uncertainty about the real value of a future stream of pension payments. The real value of a stream of pension payments may be given a downward 'tilt' of, say, 2 1/2 per cent per year. So long as this 'tilt' is certain and known to the pensioner, who can make his or her consumption decisions accordingly, the inflation protection accorded the pension may be described as 'good'. Clearly, a pension would be more highly valued by the plan member, and would cost more, if the real stream of pension payments were certain and there was no downward 'tilt'. Conceptually, the expected degree of 'tilt' should be isolated from the degree of uncertainty surrounding the real stream of pension payments.

B Contractual Linkage to the Consumer Price Index

The results are quite straightforward and require little comment. Perhaps the most useful comparison is between partial inflation protection equal to 60 per cent of the CPI, and full inflation protection subject to a deductible of 2.5 per cent per year.

Consider, for example, the results for a pension whose payment begins in 1970. In the absence of inflation protection, its real value falls to 31.2 per cent of the original level by 1985. With partial inflation protection equal to 60 per cent of the CPI, this figure is 62.0 per cent; with full inflation protection subject to a deductible, 67.4 per cent.

In the case of partial inflation protection, it is not meaningful to speak of an 'expected' degree of tilt in the stream of real pension payments. The observed rate of decline will reflect the realized rate of inflation, and no economist can predict the future rate of inflation with confidence. With full inflation protection subject to a deductible, however, the maximum rate of decline is 2.5 per cent each year. Further, this is the expected 'tilt' if, in fact, the inflation rate is expected to remain above 2.5 per cent over the term of the life annuity.

What is perhaps less apparent from Table 4.1 is the fact that the real stream of pension payments declines far more smoothly when inflation protection is full, subject to the deductible. Because inflation exceeds 2.5 per cent in every year, the real value of the pension declines steadily (and predictably) at a 2.5 per cent annual rate. With partial inflation protection, the year-to-year fluctuations in the real value of the pension are more erratic, and hence more uncertain. When inflation is high in 1974 and 1975, for example, the real value of the pension declines rapidly, at an annual rate of 4.2 per cent. When inflation is low in 1984 and 1985, the real value of the pension declines slowly, at an annual rate of 1.6 per cent.

C 'Excess' Earnings with Alternative Guide Rates

When inflation protection is delivered through 'excess' earnings, the results are more diverse. Consider, again, the results for a pension whose payment commences in 1970. Again, it is useful to focus on both the 'tilt' in the stream of real pension payments, as well as the year-to-year fluctuations.

If the guide rate is the yield (and also the return) on Treasury bills, and if the base rate is 3.5 per cent, the real value of the initial benefit declines to 74.6 per cent of its original level by 1985. Since, historically, the real interest rate on Treasury bills has averaged about one per cent, the expected downward 'tilt' in this stream of payments is about 2.5 per cent per year. In fact, the downward 'tilt' turned out to be less (as is evident from comparing this stream of payments with the case in which the pension receives full inflation protection subject to a deductible of 2.5 per cent). This is because the real interest rate on Treasury bills exceeds its historical average during the period 1970-1985. Note, in particular, that the real Treasury bill rate exceeds 3.5 per cent in every year between 1981 and 1985, and, accordingly, the real value of the pension rises steadily during this period.

The low-risk portfolio is comprised of Treasury bills (50%), long-term Canada bonds (25%) and stocks (25%). If the expected real returns on these assets equal one per cent, 2.5 per cent and 6 per cent, respectively, the expected real return on the low-risk portfolio will equal 2.625 per cent. This is less than the base rate of 3.5 per cent, so there will be an expected downward 'tilt' in the stream of real pension payments. This expected 'tilt', however, will only be about one per cent per year.

In fact, the real value of the initial benefit declines only modestly from 1970 to 1985, as it falls to 85.3 per cent of its initial level. Interestingly, this actual decline is about what one would have expected, based on the historical data on real returns. The expected real return on the low-risk portfolio, at 2.625 per cent, exceeds the expected real return on the Treasury bill portfolio, at one per cent. For this reason, the expected downward 'tilt' is less with the low-risk portfolio. Over the period 1970 to 1985, this expected result does - in fact - materialize.

The real return on the low-risk portfolio is more volatile than the real interest rate on Treasury bills. For this reason, the real value of the pension payments should fluctuate more when the guide rate is the return on the low-risk portfolio. In fact, this is exactly what occurs. In 1973 and 1974, for example, when stock prices decline sharply, the real value of the pension tied to the low-risk portfolio declines by a full 23.7 per cent. The volatility of market returns, even in this low-risk portfolio, undoubtedly explains why those plans - such as Queen's and Carleton universities - which use market returns in their guide rate, do so subject to, say, a four-year averaging provision. The purpose is to smooth year-to-year fluctuations in real pension payments. The full repercussions of realized market returns are, of course, ultimately reflected in the pensions of retired plan members.

When the market rate of return on the high-risk portfolio is used as the guide rate, analogous results occur. The high-risk portfolio is comprised of Treasury bills (25 per cent), long-term Canada bonds (25 per cent), and stocks (50 per cent). Based on the same assumptions about real returns as before, the expected real return on the high-risk portfolio equals 3.875 per cent. Since this exceeds the base rate of 3.5 per cent, there is an expected positive 'tilt' to the stream of payments, but of less than one-half of one per cent per year. In fact, the real value of the pension in 1985 equals 92.9 per cent of its original value, in spite of the positive expected 'tilt'. This simply means that the realized real return on the high-risk portfolio did, on average, fall short of 3.5 per cent (and thus of its expected value of 3.875 per cent). The real return on the high-risk portfolio is more volatile ('risky') than the real return on the low-risk portfolio. For this reason, the real value of the pension fluctuates more dramatically. In 1973 and 1974, for example, the real value of the pension tied to the high-risk portfolio declines by a full 31.1 per cent. To an economist, the readily apparent uncertainty in the real value of this stream of pension payments suggests that it lacks 'good' inflation protection, even if there is no expected downward 'tilt' in the real stream of payments.

In Table 4.3, results are presented for the CAPSA (Canadian Association of Pension Supervisory Authorities) proposal for inflation protection through 'excess' interest. The guide rate is set equal to the five-year moving average of the interest rate on long-term Government of Canada bonds. As previously noted, the choice of this guide rate does not allow the plan sponsor to immunize the pension fund reserve by actually investing in long-term Canada bonds. Nonetheless, this general approach has been followed by at least two sponsors, the Toronto Transit Commission and the City of Montreal. The results in Table 4.3 show that the real value of pension benefits can drop sharply under this 'excess' interest scheme. During the period 1972 to 1977, for example, the real value of the pension declines by 19.3 per cent. During the next five years, the real value of the pension declines by a further 15.6 per cent. Commencing in 1983, however, the real value of the pension begins to rise, and does so through 1985. Because of the five-year averaging together with the very high level of interest rates in the early 1980's, the real value of the pension would undoubtedly increase further in 1986 and 1987.

For all the 'excess' earnings approaches, the real values of the pension are also shown for the case in which the base rate equals 7 per cent. This is the base rate for past service recommended in the Green Paper, Better Pensions for Canadians. Since few plans use an interest rate in excess of 7 per cent in their actuarial valuations, the logic of proposing this rate is that its use for past service would not increase the reported value of past service liabilities. There is only one difference in the simulations when the base rate is set equal to 7 per cent rather than 3.5 per cent: the real value of the pension declines, in every year, by 3.5 per cent relative to the case in which the lower base rate is used.

D Overview and Summary Comments

Historical simulations of the time path of real benefits when the pension receives a particular type of inflation protection are straightforward, yet important. One should not look only at the ratio of the real value of the pension after, say, 15 years in order to measure the effectiveness of the inflation protection so provided. The year-to-year fluctuations in the real value of the pension are at least of equal importance. Indeed, to economists, there is a need to distinguish clearly between (1) the expected degree of 'tilt' in the real stream of pension payments, and (2) the degree of uncertainty that exists, year-by-year, in the real value of these payments. The discussion of the simulation results seeks to highlight this distinction. Finally, one must remember that these historical simulations focus exclusively on the time paths of the real pension payments received by hypothetical retirees. The simulations do not address the expected cost (relative to no inflation protection) and the uncertainty about such costs, both of which are of concern to plan sponsors.

TABLE 4.1 (a)

THE REAL VALUE OF PENSIONS RECEIVING INFLATION PROTECTION LINKED TO MOVEMENTS IN THE CONSUMER PRICE INDEX (CPI)

Year	No Inflation Protection	40% of CPI	60% of CPI	75% of CPI Less 1%	CPI Less 2.5%
			Year of Retirement - 1965		
(Initial)	1,000	1,000	1,000	1,000	1,000
1965	976	986	990	984	976
1966	943	965	977	966	953
1967	910	944	962	948	929
1968	874	922	947	929	907
1969	836	898	930	910	885
1970	810	880	918	893	863
1971	787	865	908	878	842
1972	751	841	891	859	821
1973	697	804	864	835	801
1974	629	755	828	805	782
1975	568	709	794	776	763
1976	528	678	771	755	744
1977	489	647	747	733	726
1978	449	614	721	710	708
1979	411	583	696	687	691
1980	373	549	668	664	674
1981	332	511	637	637	658
1982	230	480	610	615	642
1983	283	464	597	600	626
1984	271	452	586	588	611
1985	261	441	577	576	596

TABLE 4.1 (b)

THE REAL VALUE OF PENSIONS RECEIVING INFLATION PROTECTION LINKED TO MOVEMENTS IN THE CONSUMER PRICE INDEX (CPI)

Year	No Inflation Protection	40% of CPI	60% of CPI	75% of CPI Less 1%	CPI Less 2.5%
			Year of Retirement - 1970		
(Initial)	1,000	1,000	1,000	1,000	1,000
1970	968	981	987	982	976
1971	941	864	976	965	952
1972	898	937	957	945	929
1973	834	896	929	918	906
1974	752	841	890	885	884
1975	679	789	853	853	862
1976	631	755	828	829	841
1977	585	721	803	805	821
1978	536	684	775	780	801
1979	492	649	748	755	781
1980	447	612	719	730	762
1981	397	570	684	701	744
1982	358	534	656	676	725
1983	339	516	641	660	708
1984	325	503	630	646	690
1985	312	491	620	633	674

TABLE 4.1 (c)

THE REAL VALUE OF PENSIONS RECEIVING INFLATION PROTECTION LINKED TO MOVEMENTS IN THE CONSUMER PRICE INDEX (CPI)

Year	No Inflation Protection	40% of CPI	60% of CPI	75% of CPI Less 1%	CPI Less 2.5%
			Year of Retirement - 1975		
(Initial)	1,000	1,000	1,000	1,000	1,000
1975	903	939	959	964	976
1976	839	899	912	937	952
1977	778	858	871	910	929
1978	714	814	828	882	906
1979	654	772	785	854	884
1980	594	728	742	824	862
1981	528	677	693	792	841
1982	477	636	649	764	821
1983	451	614	621	745	801
1984	432	599	604	730	781
1985	415	585	589	716	762
			Year of Retirement - 1980		
(Initial)	1,000	1,000	1,000	1,000	1,000
1980	908	942	961	966	976
1981	807	877	898	927	952
1982	728	823	840	764	929
1983	689	796	805	745	906
1984	660	775	782	730	884
1985	634	757	763	716	862

TABLE 4.2 (a)

HISTORICAL SIMULATION OF REAL VALUE OF PENSION BENEFIT RECEIVING INFLATION PROTECTION THROUGH 'EXCESS' EARNINGS: MEMBER RETIRES IN 1965

Year	No Inflation ·Protection	Treasury Bills		Low-Risk Portfolio		High-Risk Portfolio	
		RV=.-35	RV=.07	RV=.035	RV=.07	RV=.035	RV=.07
(Initial)	1,000	1,000	1,000	1,000	1,000	1,000	1,000
1965	976	975	943	975	943	982	950
1966	943	955	894	922	862	901	843
1967	910	927	839	909	823	917	830
1968	874	916	802	918	804	960	840
1969	836	905	767	872	739	894	757
1970	810	919	753	896	734	896	734
1971	787	879	697	881	698	890	705
1972	751	837	642	883	677	941	722
1973	697	778	577	806	597	849	629
1974	629	722	517	674	484	649	465
1975	568	683	474	649	450	640	444
1976	528	681	457	663	445	656	440
1977	489	647	420	632	410	630	409
1978	449	625	392	631	396	659	414
1979	411	612	372	646	392	723	440
1980	373	602	354	644	378	747	439
1981	332	618	351	591	336	639	363
1982	300	631	347	628	345	664	365
1983	283	639	340	673	358	752	400
1984	271	664	341	684	352	740	381
1985	261	675	336	744	370	831	431

Note: The low-risk portfolio consists of Treasury bills (50%), long-term Canada bonds (25%), and stocks (25%). The corresponding proportions for the high-risk portfolio are 25%, 25% and 50%. RV is the base rate in the 'excess' earnings formula. There is no floor or ceiling in the 'excess' earnings formula.

TABLE 4.2 (b)

HISTORICAL SIMULATION OF REAL VALUE OF PENSION BENEFIT RECEIVING INFLATION PROTECTION THROUGH 'EXCESS' EARNINGS: MEMBER RETIRES IN 1970

Year	No Inflation Protection	Treasury Bills		Low-Risk Portfolio		High-Risk Portfolio	
		RV=.-35	RV=.07	RV=.035	RV=.07	RV=.035	RV=.07
(Initial)	1,000	1,000	1,000	1,000	1,000	1,000	1,000
1970	968	1,016	982	1,027	993	1,002	969
1971	941	971	909	1,010	945	995	931
1972	898	924	837	1,013	916	1,053	953
1973	834	859	752	924	809	949	831
1974	752	796	675	773	655	726	614
1975	679	755	618	744	609	716	586
1976	631	752	596	760	602	733	581
1977	585	715	548	725	555	705	540
1978	536	690	512	724	536	737	547
1979	492	676	485	741	531	809	580
1980	447	665	461	738	512	836	580
1981	397	682	458	678	455	715	479
1982	358	696	452	719	467	743	482
1983	339	706	443	772	484	841	528
1984	325	733	445	784	476	828	503
1985	312	746	438	853	501	929	546

Note: The low-risk portfolio consists of Treasury bills (50%), long-term Canada bonds (25%), and stocks (25%). The corresponding proportions for the high-risk portfolio are 25%, 25% and 50%. RV is the base rate in the 'excess' earnings formula. There is no floor or ceiling in the 'excess' earnings formula.

TABLE 4.2 (c)

HISTORICAL SIMULATION OF REAL VALUE OF PENSION BENEFIT RECEIVING INFLATION PROTECTION THROUGH 'EXCESS' EARNINGS: MEMBER RETIRES IN 1975

Year	No Inflation Protection	Treasury Bills		Low-Risk Portfolio		High-Risk Portfolio	
		RV=.-35	RV=.07	RV=.035	RV=.07	RV=.035	RV=.07
(Initial)	1,000	1,000	1,000	1,000	1,000	1,000	1,000
1975	903	947	916	962	930	986	954
1976	839	944	883	983	919	1,011	946
1977	778	897	812	937	848	971	879
1978	714	866	758	936	819	1,016	889
1979	654	849	719	958	811	1,114	944
1980	594	834	683	955	782	1,152	944
1981	528	856	679	877	695	985	780
1982	477	874	670	931	713	1,024	785
1983	451	886	656	998	740	1,160	860
1984	432	920	659	1,015	728	1,141	818
1985	415	936	649	1,104	765	1,281	889

Note: The low-risk portfolio consists of Treasury bills (50%), long-term Canada bonds (25%), and stocks (25%). The corresponding proportions for the high-risk portfolio are 25%, 25% and 50%. RV is the base rate in the 'excess' earnings formula. There is no floor or ceiling in the 'excess' earnings formula.

TABLE 4.2 (d)

HISTORICAL SIMULATION OF REAL VALUE OF PENSION BENEFIT RECEIVING INFLATION PROTECTION THROUGH 'EXCESS' EARNINGS: MEMBER RETIRES IN 1980

Year	No Inflation Protection	Treasury Bills		Low-Risk Portfolio		High-Risk Portfolio	
		RV=.-35	RV=.07	RV=.035	RV=.07	RV=.035	RV=.07
(Initial)	1,000	1,000	1,000	1,000	1,000	1,000	1,000
1980	908	983	951	997	964	1,034	1,000
1981	807	1,009	944	915	856	884	827
1982	728	1,030	932	972	879	919	832
1983	689	1,043	913	1,042	912	1,041	911
1984	660	1,084	918	1,059	897	1,024	867
1985	634	1,102	903	1,152	944	1,150	942

Note: The low-risk portfolio consists of Treasury bills (50%), long-term Canada bonds (25%), and stocks (25%). The corresponding proportions for the high-risk portfolio are 25%, 25% and 50%. RV is the base rate in the 'excess' earnings formula. There is no floor or ceiling in the 'excess' earnings formula.

TABLE 4.3

HISTORICAL SIMULATIONS OF REAL VALUE OF PENSION BENEFIT RECEIVING INFLATION PROTECTION THROUGH CAPSA 'EXCESS' EARNINGS PROPOSAL

	Year of Retirement											
	1965			1970			1975			1980		
Year	*NIP	RV = 0.035	RV = 0.070	*NIP	RV = 0.035	RV = 0.070	*NIP	RV = 0.035	RV = 0.070	*NIP	RV = 0.035	RV = 0.070
Initial	1,000	1,000	1,000									
1965	976	992	959									
1966	943	974	912									
1967	910	957	866									
1968	874	939	822									
1969	836	923	781	1,000	1,000	1,000						
1970	810	922	755	968	999	966						
1971	787	926	734	941	1,004	939						
1972	751	917	702	898	993	899						
1973	697	883	655	834	957	838						
1974	629	829	594	752	898	761	1,000	1,000	1,000			
1975	568	780	541	679	845	693	903	941	910			
1976	528	760	510	631	823	652	839	917	858			
1977	489	739	480	585	801	614	778	892	807			
1978	449	714	448	536	774	574	714	862	754			
1979	411	692	420	492	749	537	654	834	706	1,000	1,000	1,000
1980	373	667	392	447	723	501	594	805	659	908	964	933
1981	332	637	362	397	690	463	528	768	609	807	921	862
1982	230	624	343	358	676	439	477	752	577	728	902	816
1983	283	643	342	339	696	437	451	775	575	689	929	813
1984	271	674	347	325	730	444	432	813	583	660	975	825
1985	261	708	352	312	767	450	415	854	592	634	1,023	838

* NIP - No Inflation Protection

V TWO SPECIAL TOPICS: INDEX-LINKED MORTGAGES AND THE GOVERNMENT OF CANADA'S PROPOSED 'EXCESS' EARNINGS PLAN FOR FEDERAL EMPLOYEES

A Index-Linked Mortgages

The following results are now well known:

(1) If an n-period, indexed bond (or, more precisely, an n-period indexed mortgage) were traded in the Canadian capital market, a pension plan sponsor could use this instrument to hedge fully an n-period, indexed pension or annuity. Further, the real interest rate on the indexed financial instrument would represent the appropriate interest rate at which to cost a fully-indexed pension or annuity.

(2) In theory, the expected real return required by investors on an n-period, indexed bond should be less than the expected real return on an otherwise identical n-period, nominal bond, since the investor in the indexed instrument is not exposed to inflation risk.

(3) In spite of the expected reduction in debt servicing costs associated with issuing indexed rather than nominal debt, and in spite of the fact that at least some firms would appear to be able to reduce the uncertainty about their net operating earnings by issuing indexed rather than nominal debt, no private firms in North America (or elsewhere) have elected to issue indexed debt.

In a capital market without indexed financial instruments, a plan sponsor who wishes to hold that portfolio which best hedges a fully-indexed pension would invest exclusively in short-term debt instruments such as Treasury bills.[21] This result, which also motivates the case for choosing the yield on Treasury bills as the guide rate in an 'excess' earnings scheme, may seem somewhat perplexing. The fully-indexed pension to be hedged represents a long-term liability, yet the plan sponsor must hold a portfolio of very short-term investments. Further, the plan sponsor is well-suited to bearing the real interest rate risk associated with a long-term index bond, because of the long-term nature of the pension liability. In addition, it is likely that the market will compensate those who bear real interest rate risk by pricing long-term index bonds to yield a higher return than short-term index bonds. Yet this opportunity to earn a higher real return, and thus to reduce pension costs, is not available in the absence of long-term index bonds.

The situation is analogous to that of a plan sponsor who, in a world of no inflation, hedges a long-term, nominal (and thus 'real') pension liability by investing in long-term, nominal (and thus 'real') bonds. If long-term interest rates exceed short-term rates, then the plan sponsor is able to reduce the cost of providing the long-term, nominal annuities and - at the same time - fully hedge the pension commitment.

For these reasons, the possibility that the Government of Canada might issue index bonds to encourage private pension plans to improve inflation protection has received considerable attention, dating back at least to the late 1970's.[22] Partly in response to the dramatic rise in interest rates that occurred in the early 1980's, economists in Canada began to devote increased attention to the possible advantages to mortgage borrowers of introducing price-level-adjusted or index mortgages into the Canadian capital market.[23] Throughout this discussion, it was clear that index mortgages would be a potentially attractive investment for pension funds.

In October 1986, Index-Linked Mortgages (ILM's) were introduced into the Canadian capital market by the Co-Operative Housing Foundation of Canada, in conjunction with the Canada Mortgage and Housing Corporation (CMHC). Since an index mortgage is the ideal instrument with which to hedge a fully indexed annuity, the availability and the pricing of ILM's are of particular relevance to the mandate of this Task Force.

The salient features of the ILM are as follows:

(1) the interest rate is set annually, and equals the agreed-upon real interest rate for the full term of the mortgage plus an inflation rate factor, equal to the annual inflation rate as measured by the CPI for the 12-month period ending six months prior to the anniversary (interest adjustment) date;

(2) the (book) value of the mortgage plus accrued interest at the time of

default is fully insured by the CMHC under the National Housing Act;

(3) mortgage payments are adjusted on the anniversary date, and are increased by the same inflation factor as for the interest rate, less 2 per cent, which thus produces a downward 'tilt' of 2 per cent per year in the real stream of mortgage payments;

(4) the mortgage has a 35-year term, with a 30-year amortization period (so that the amortization period can be extended if inflation over the life of the mortgage averages more than the inflation rate assumed to set the initial payment, or if the co-operative experiences financial difficulties and seeks the deferment of a few of the annual increases); and

(5) the borrower has no prepayment option (so the lender is protected from an early repayment in the even that, say, real interest rates fall).

Except for the 6-month lag in the incorporation of the inflation factor, the lender receives a guaranteed real interest rate and full protection from inflation. The real return (i.e., inclusive of any realized or unrealized capital gain or loss) earned by the lender in any given year will fluctuate with changes in the real rate of interest, since the agreed-upon real interest rate is set for the full term of the mortgage. If the real interest rate rises, the market value of the mortgage will be beneath its book value, and conversely. The CMHC insures the book value of the mortgage, so that an unrealized capital gain is uninsured, while the lender can recoup an unrealized capital loss in the event of default.

In 1986, the Co-Operative Housing Foundation raised about $220 million through ILM's. The initial loan was at an interest rate of 5.25 per cent, and the rate has subsequently fallen to 4.75 per cent.[24] In 1987, the expectation is that ILM's will be used to raise over $300 million. About 90 per cent of the ILM's issued to date have been acquired by pension funds. There is as yet no secondary market in ILM's, and hence ILM's are at present not liquid.[25]

The (perhaps) high real interest rate on the ILM's issued to date merits comment. The real rate of return on an ILM, if held to maturity, is known with certainty, since it equals the fixed real interest rate that is set at the date of issuance. In addition, the book value of the outstanding balance (and accrued interest) is insured by the CMHC. As noted in chapter three, unanticipated inflation reduces the real rate of return on bills, bonds and stocks, and thus on a diversified portfolio comprised of such investments. Aside from the 6-month lag in the incorporation of the inflation factor, the real rate of return on ILM's should be unaffected by unanticipated inflation. Indeed, if real interest rates on traditional fixed-income securities initially fall in response to an unanticipated rise in inflation, the real return on ILM's - with their predetermined real interest rate - would rise. These considerations suggest that ILM's could reduce the risk of a well-diversified portfolio of financial assets. In turn, this suggests that investors should be willing to hold ILM's at a lower real interest rate, due to their ability to reduce portfolio risk.

From this perspective, one might believe that the real interest rate on ILM's is above its equilibrium level (relative to the real interest rate on other assets), in part because the instrument is new and is still being assessed by potential investors.[26] At the same time, one must remember that real interest rates on competing financial instruments remain well above their historical levels. Because long-term inflation expectations are not observable, the strongest evidence to this effect is found in the market for short-term debt instruments. Because short-term inflation expectations are likely to follow the short-term inflation rate quite closely, it useful to focus on the market for Treasury Bills. At present, the nominal interest rate on 90-day Treasury Bills is in excess of 8 per cent, while the inflation rate is somewhat in excess of 4 per cent. The implied real interest rate on Treasury bills is about 4 per cent, which is far above the historical average of about one per cent. The fact that real interest rates on traditional debt instruments remain quite high undoubtedly influences the real interest rate required on ILM's. Fund managers, especially those who are subject to periodic performance reviews, may be reluctant to purchase ILM's, since a real interest rate of 4.75 per cent may be deemed unattractive in the present climate of high real returns.

The ILM, or a like instrument, is an ideal investment to hold in a pension fund reserve established for inactive members whose pensions are receiving inflation protection. This is true regardless of whether the inflation protection is delivered through 'excess' earnings or through contractual linkage to the consumer price index. At present, the 'easiest' match for a program of mandatory inflation protection would occur if pensions were required to increase each year at the inflation rate less 2 per cent.[27]

The question of whether ILM's qualify as an eligible pension fund investment under the applicable pension standards legislation needs to be addressed. On April 13, 1987, the Pension Commission of Ontario (P.C.O.) issued a 'Statement of Investment Objectives and Principles for all Pension Plans'. In its revised recommendations on the regulation of pension fund investments, the P.C.O. recommends the adoption of the prudent person approach, with an accompanying definition of prudence, as follows (page 1):

> 'Recommendation 1 - Prudent Person Approach
>
> The prudent person approach shall be adopted for investments made by pension plans registered in Ontario.
>
> Recommendation 2 - Definition of Prudence
>
> The Prudent Person Approach shall be defined as the exercise of care, diligence and skill in the investment and administration of fund assets that a person of ordinary prudence shall exercise in dealing with the property of another person using all relevant knowledge and skill that a person by reason of his or her profession, business or calling, ought to possess.'

To an economist, there is strong reason to believe that ILM's would satisfy a 'prudent person' test, especially if the pension plan were required to provide inflation protection to inactive plan members. Indeed, the risk-return characteristics of ILM's appear to be, if anything, excessively favourable, as the real return (if held to maturity) of 4.75 per cent seems high relative to the degree of risk that ILM's represent.[28]

To conclude, ILM's represent the first indexed financial instrument in the Canadian capital market. The Task Force should monitor the real interest rate demanded by investors on ILM's, as well as the availability of ILM's. In addition, the Task Force should try to ascertain if the Federal or provincial governments are planning to extend the use of indexed financial instruments. Although many fund managers may be prepared to hold ILM's to maturity (or to arrange private trades), other potential investors may be concerned with their present lack of liquidity. The possibility of issuing mortgage-backed securities linked to ILM's, as a way of improving their liquidity, has already been raised, and could presumably resurface.

B The Government of Canada's Proposed 'Excess' Earnings Plan for Federal Employees

Bill C33, introduced in the House of Commons on 16 December 1986, includes revisions to the inflation protection in the federal public service pension plan, as well as the plans for the Canadian Armed Forces and the Royal Canadian Mounted Police. In particular, Bill C33 proposes to replace full and contractual inflation protection, for future service only, by a variant of the 'excess' earnings approach. In an earlier Memorandum of Agreement between the Treasury Board and the Professional Institute of the Public Service of Canada and the Public Service Alliance of Canada, the following principles were enunciated:[29]

> 'It is clearly understood that the current guarantee of unlimited inflation adjustment will be terminated.'
>
> 'The actual level of inflation protection for all existing and future pensioners will be based on the earnings of the fund and will be determined by the President of the Treasury Board on the basis of recommendations of the Management Board.'

In proposing the legislation, the Federal government sought to respond to two frequent concerns expressed about its pension plans: first, that these plans may contribute to a level of total compensation for federal employees that exceeds the total compensation of their counterparts in the private sector; and second, that these plans contain features, including - in particular - the full indexing of pension benefits, that cannot be readily duplicated in the private sector. Before proposing the legislation, Treasury Board President, Robert de Cotret, consulted extensively with the Advisory Committee on the Public Service Superannuation Act, which was established under statute and consists of six senior Public Service union representatives, including three union presidents and the Chairman of the Staff Side of the National Joint Council; one representative of the Federal Superannuates National Association; and five management representatives, including the Chief Actuary of the Department of Insurance.

In brief, the major details of the 'excess' earnings proposal are as follows.

The guide rate is to be the average rate of return on 10 plans chosen from a sample of 50 large private sector plans invested in balanced portfolios. The 10 plans will be selected in advance by the Pension Management Board and interest credits will be made to the fund based on the future performance of these 10 benchmark funds as determined by a performance measurement service. This unusual feature is made necessary by the fact that the Federal Public Service Superannuation Plan has no investment fund, and it was felt to be unfair to plan members to credit interest based on the (present) shadow portfolio of long-term Government of Canada bonds.

The base rate, which will serve to determine the degree of 'tilt', if any, in the expected stream of real pension payments, has not yet been determined. The base rate will determine, in addition, the cost of the inflation protection, and ultimately both employee and employer contributions. The Treasury Board President has indicated that the legislation will be framed so as to permit contribution rates to be set at levels which are consistent with providing full inflation protection. (To accomplish this objective, the base rate would have to be set equal to the expected real return on the 10 private sector funds.)

There is to be a cumulative real ceiling, so that the real value of a retiree's pension will not rise above its initial level. There will also be a nominal floor, as pensions in pay will not be reduced, even if 'excess' fund earnings are negative.

The determination of the level of post-retirement increases to be made in each year is to be left to the Pension Management Board, which will prescribe the relevant by-laws. The post-retirement adjustments so determined will apply to beneficiaries under the Public Service Superannuation Act, the Canadian Forces Superannuation Act, and the Royal Canadian Mounted Police Superannuation Act. The new Pension Management Board will have its membership expanded to fourteen, plus an independent Chair. The Board will have six members representing Public Service employees, one member representing pensioners, and seven members representing the employer.

The most crucial feature of the 'excess' earnings proposal is the choice of the guide rate. In setting the guide rate equal to the average return on the 10 private sector plans, the Federal government was motivated - at least in part - by the desire to credit its plans with an interest rate in excess of that provided on the shadow portfolio of long-term Canada bonds.[30] Yet, in a well-functioning capital market, higher rates of return can be obtained, over the long run, only by bearing a corresponding increase in risk.

If an 'excess' earnings proposal is to provide good inflation protection, the real rate of return embodied in the guide rate must be fairly stable. Only then will the 'excess' earnings so generated closely track the inflation rate. Yet the concern of those who designed this 'excess' earnings formula seems to have focused on the average return, over time, on a well-balanced fund versus a fund comprised exclusively of Government of Canada bonds. The year-to-year volatility in the real return on a balanced fund appears to have received far less attention.[31]

In general, real rates of return on balanced pension fund portfolios have been fairly volatile. Listed in Table 5.1 are the median real rates of return for pension fund assets for the period 1961 to 1985, derived from performance data reported by SEI Financial Services. These real rates of return exhibit considerable year-to-year volatility. The annual real returns varied from a low of -25.0 per cent (1974), to a high of 19.2 per cent (1985). For the reasons cited at length in chapters three and four, an 'excess' earnings proposal with this degree of return volatility reflected in the guide rate will not stabilize the real value of the 'protected' stream of pension payments. For this reason, it cannot be deemed to deliver good inflation protection.

In its background Report for the Treasury Board (see footnote 32), William M. Mercer Ltd. raised the possibility of segregating pensioner assets from the total assets of the plan, and investing pensioner assets in securities which provide less volatile real rates of return. As noted in the Report (page 1C-57):

> 'In general, reduced volatility in return is achieved at a sacrifice in the absolute rates of return. Thus, although the year-by-year adjustments in pensions may be smoother, it is likely that over the longer term they would be somewhat lower than if a more aggressive investment stance were taken.'

The Report then notes that a portfolio of Treasury Bills would provide the most stable real returns, and thus the highest correlation of 'excess' earnings with inflation.

In principle, one could use pension fund performance in the private sector to choose the rate at which to credit interest on the fund for active employees. One could then use a different measure of portfolio performance (guide rate) to identify 'excess' earnings for the purpose of delivering inflation protection to inactive employees. If a low-risk portfolio comprised of short-term debt instruments like Treasury bills were used to identify 'excess' earnings, its expected return would, of course, be lower than the expected return on the balanced portfolio. This is, of course, just a reflection of the risk-return tradeoffs that exist in the capital market. The fact that securities with volatile real returns are priced by the market to yield high expected returns suggests why an 'excess' earnings formula which is motivated by longer-run considerations may not serve pensioners well.[32]

The 'excess' earnings formula proposed for Federal government employees is clearly motivated by considerations other than the delivery of inflation protection per se. For example, the initiative is clearly motivated by the desire of the Federal government to bring its pension plans more in line with practice in the private sector. At the same time, for members, an important objective is to devise a means of crediting 'interest' to the fund at a rate in excess of the rate on a notional portfolio of Government of Canada bonds, and thus to reduce the (shared) contribution rate necessary to finance a given level of benefits. Further, there are a few extant examples of this approach. Queen's and Carleton universities, for instance, have 'excess' earnings formulas which use a (smoothed) market rate of return on a balanced portfolio as the guide rate.

C Summary and Conclusions

The ILM's introduced by the Co-Operative Housing Foundation of Canada, in conjunction with the Canada Mortgage and Housing Corporation, represent an ideal investment for sponsors wishing to hedge inflation risk under a system of mandatory inflation protection. This is true regardless of whether inflation protection is delivered by contractual linkage to the CPI, or by an 'excess' earnings scheme where the objective is to track closely the inflation rate.

The 'excess' earnings system proposed by the Federal government for its employees, and contained in Bill C-33, centers on a guide rate linked to the performance of balanced pension funds in the private sector. However, the volatility of the real returns on such funds, and ultimately the volatility in the 'excess' investment earnings so delivered, suggests that this system is not likely to deliver good inflation protection per se.

TABLE 5.1

MEDIAN RETURNS EARNED BY PENSION FUNDS IN CANADA, 1961-1985

Year	Nominal Return	Real Return
1961	13.3%	13.0%
1962	2.0%	0.4%
1963	8.1%	6.2%
1964	11.1%	9.3%
1965	3.5%	0.5%
1966	-2.3%	-5.8%
1967	7.6%	3.4%
1968	9.4%	5.4%
1969	-3.2%	-7.9%
1970	1.3%	-0.2%
1971	12.5%	7.6%
1972	18.4%	13.3%
1973	-2.1%	-11.4%
1974	-12.7%	-25.0%
1975	13.2%	3.7%
1976	12.4%	6.5%
1977	8.7%	-0.8%
1978	13.5%	5.1%
1979	15.0%	5.2%
1980	18.3%	7.1%
1981	1.5%	-10.6%
1982	21.1%	11.8%
1983	20.0%	15.5%
1984	8.8%	5.0%
1985	23.5%	19.2%
1961-1985	8.6%	2.8%
1966-1975	3.8%	-2.0%
1976-1985	14.1%	6.3%

Source: SEI Financial Services, as cited by the Wyatt Company, 'Index-Linked Mortgages as a Pension Fund Investment', November 1986, prepared for the Canada Mortgage and Housing Corporation.

VI RELATED PENSION ISSUES

There are two sections of Bill 170 which could be affected by the Task Force's recommendations on mandatory inflation protection. These are: (1) the requirement, in contributory plans, that the employer's contribution must purchase at least 50 per cent of the pension benefit earned after December 31, 1986; and (2) the transfer options provided to terminated employees with respect to their deferred pensions. The relevant issues, and the impact of the Task Force's recommendations on mandatory inflation protection, are sketched below.

A Employer's Contribution Must Purchase at Least 50 Per Cent of the Pension Benefit

Section 40(3) of Bill 170 provides that, in a contributory plan,[33] the member's own contributions after 31 December 1986 cannot be used to purchase more than 50 per cent of the commuted value of the pension or deferred pension earned after that date. In essence, the employer must pay for at least 50 per cent of the benefits earned by the plan member after 31 December 1986. If the member's own contributions plus interest exceed 50 per cent of the commuted value of the benefit, the member is entitled to a payment from the pension fund equal to this excess (Section 40(4)).

This provision has a parallel in Section 21(2) of Bill C-90, which affects pension plans subject to Federal jurisdiction. Bill C-90 provides that if a member's own contributions plus interest after 31 December 1986 exceed 50 per cent of the pension benefit earned after that date, the pension benefit to the member shall be increased by the amount of the excess. (Interest is to be credited at a rate equal to or greater than the rate fixed by the Superintendent of Pensions, which is to reflect reasonably current interest rates.) However, Section 21(4) exempts from this provision any plan which provides for the indexation of deferred pensions, up to the date payments commence, equal to 75 per cent of the inflation rate less one per cent, or any other formula which on average would provide comparable protection.

The logic behind Section 40(3) of Bill C-90 is well-known to pension consultants. Because pension benefit accruals increase sharply with age under the terms of most defined benefit plans, a member's own contributions (plus interest) may be sufficient to pay for more than 100 per cent of the pension benefit if the member is young. In general, the percentage of the commuted benefit purchased by the plan member's own contributions will decline as the plan member ages.[34] This is especially true if the inflation rate is high. In Table 6.1, the time path of benefit accruals in a representative final earnings plan is shown when the inflation rate is zero and when the inflation rate equals 10 per cent. When the inflation rate is high, the value of the pension benefit earned at age 45 is only one per cent of salary, even if the member entered the plan at age 30. If the inflation rate is zero, the value of the benefit earned at age 45 is 10 per cent of salary. If the member contributes a constant fraction of salary (say, 5 per cent) to the plan, then - if the inflation rate is high - the member's own contributions may be sufficient to purchase all of the accruing benefits when the plan member is young. In the example in Table 6.1, the plan member's own contributions, if 5 per cent of salary, are sufficient to purchase all of the pension benefit earned until the member attains age 54.

The example in Table 6.1 is quite dramatic, since the inflation rate is assumed to be 10 per cent. Yet the basic point is clear: the 'backloading' of pension benefits with age, a phenomenon which is intensified when the inflation rate is high, is such that a young member's own contributions may pay for more than 50 per cent (indeed, more than 100 per cent) of the member's accrued pension benefit.

There are two policy questions that the Task Force may wish to address:

(1) In light of Section 40(3) of Bill 170, is it necessary to extend mandatory inflation protection to terminated plan members who are entitled to deferred pensions?

(2) If mandatory inflation protection is legislated for terminated members entitled to deferred pensions, is it appropriate to drop Section 40(3) and thus to relieve the employer of the responsibility of purchasing at least 50 per cent of the benefit in contributory plans?

The answer to the first question is straightforward, and it is 'yes'. In 1984, 54.3 per cent of the members of occupational pension plans in the private sector were in non-contributory plans.[35] For these plan members, Section 40(3) is irrelevant. Yet members of non-contributory plans presumably forgo cash wages in return for their pension benefits, and there is no logical reason to exclude them from legislation designed to preserve, at least in part, the real value of their deferred pensions during the deferral period.

The answer to the second question is less straightforward. If mandatory inflation protection is legislated for deferred pensions, the result will be to enhance the effective portability of pension credits, and thus to improve the pension entitlements at retirement age of mobile workers. Clearly, this is a major objective of Section 40(3) of Bill 170. Further, if deferred pensions are subject to mandatory inflation protection, their commuted values will rise, to reflect (in effect) the lower interest rate used to determine the present value of future pension payments. Nonetheless, the young member's own contributions plus interest will still - on occasion - be more than sufficient to purchase in excess of 50 per cent of the accrued benefit. (As evident from Table 6.1, the 'backloading' of pension accruals drops sharply when the inflation rate is zero, and hence when there is no erosion by inflation of the real value of the deferred pension. This reduces - but does not eliminate - the possibility that a young member's own contributions plus interest will pay for more than 50 per cent of the accrued benefit.)

If the Task Force believes that it is 'unfair' for an employee's own contributions plus interest to purchase more than 50 per cent of the accrued pension benefit, then the Task Force will not want to recommend a change to Section 40(3). If the Task Force believes that mandatory inflation protection for deferred pensions is a sufficient measure to enhance the effective pension entitlements of the mobile worker, the Task Force could recommend that Section 40(3) be dropped.

B The Transfer Options Provided to Terminated Employees

Section 43(1) of Bill 170 sets forth the transfer options for a terminated plan member who is entitled to a deferred pension. The plan member can require the plan administrator to pay the commuted value of the deferred pension:

(1) to the pension fund of another pension plan;
(2) to a prescribed retirement savings arrangement; or
(3) for the purchase of a deferred life annuity.

If the plan is contributory, then Section 40(3) applies, so that the plan member's own contributions (plus interest) cannot be used to purchase more than 50 per cent of the commuted value of the deferred pension, for service earned after December 31, 1986.

The purpose of Section 43(1) of Bill 170 is to promote the effective portability of pension credits, and thus to increase the likelihood that mobile workers will receive adequate pension income when they reach retirement age.

There are three distinct issues for the Task Force. First, to the extent that option (2) is exercised, the 'money purchase' element in the system of employment pension plans will increase. This increases the importance of the Task Force's addressing the question of whether mandatory inflation protection is to be extended to money purchase plans, including RRSP's or their equivalent. Second, there exists the question of whether the introduction of mandatory inflation protection will make unnecessary the provision of these options to the plan member. In essence, the question is whether the plan sponsor should be allowed to keep the terminated member 'on the books', and thus pay the deferred pension - inclusive of the mandatory inflation updates - when it becomes due. Third, there exists the question of how the introduction of mandatory inflation protection could best complement Section 43(1), if this section is retained. The succeeding discussion addresses the latter two issues.

If the pensions of deferred annuitants must receive a minimum degree of inflation protection, then the case for providing the plan member with the options contained in Section 43(1) is weakened. Section 43(1) is motivated, in large part, by the recognition that virtually no employers update the deferred pensions of terminated members during the deferral period, in order to offset the eroding impact of inflation. This fact has been a major concern to those seeking pension reform. Yet, if the real value of the deferred pensions of plan members is preserved during the deferral period, mobile employees will reach retirement age with far better pension entitlements than would otherwise be the case. There are complications involved in permitting a terminating plan member to require a pay-out from the plan, if the plan is less than fully funded, as acknowledged in Section 43(2). These complications, together with the reduced need for the mobile employee to have these options, suggest that Section 43 of Bill 170 might usefully be re-examined.

If Section 43 (1) is unaltered, option (1) - the option to transfer the commuted value to the pension plan of the new employer, if the latter agrees- will be unaffected. (Because of mandatory inflation protection, however, the commuted value of the deferred pension will increase.) Similarly, option (2)- to transfer the commuted value to a prescribed savings arrangement, such as a locked-in RRSP - will also be unaffected. Option (3), the purchase of a deferred life annuity, could be adjusted simply by specifying that the deferred life annuity must receive (at least) the minimum degree of inflation protection prescribed by legislation.

If Section 43(1) is retained, there will be no additional complications if mandatory inflation protection is made retroactive. If inflation protection is not retroactive, then a 'split' annuity would be purchased under Option (3), with the past service element not subject to inflation adjustments and the future service element subject to these updates. If inflation protection were retroactive, option (3) would no longer require a 'split' annuity, as the entire deferred life annuity would receive the prescribed degree of inflation protection. (If the retroactive introduction of mandatory inflation protection sets a lower standard of protection for past service credits, then a different 'split' annuity would be required.) For options (1) and (2), the only impact of making inflation protection retroactive would be to raise the commuted value of the deferred pension, and hence the amount that the terminating employee could require to be paid to the plan of the new employer or into the prescribed savings arrangements.

C Summary Observations

The major points in this chapter can be summarized succinctly.

(1) If mandatory inflation protection is introduced for terminated employees entitled to deferred pensions, the Task Force may wish to recommend the elimination of the requirement that the employer pay for at least 50 per cent of the commuted value of the pension benefit (Section 40(3) of Bill 170). The motivation would be twofold. First, the effective portability of pension credits will have been increased through the mandatory inflation protection. Second, there exists a provision in the parallel Federal legislation which exempts employers from this requirement if deferred pensions are updated during the deferral period by 75 per cent of the inflation rate less one per cent, or by a formula which on average produces an equivalent result. The latter provision may be seen, in part, as an attempt by the Federal government to encourage plan sponsors to introduce formulas for inflation protection into their plans. If the Task Force deems that it would be 'unfair' for employers to pay for less than 50 per cent of the commuted value of the (enhanced) pension benefit, then the Task Force would recommend that there be no change in Section 40(3).

(2) If mandatory inflation protection is introduced, Section 43(1) of Bill 170, which permit a terminating employee to require the pay-out of the commuted value of the pension benefit, may merit re-examination. In general, the argument for providing the member with this right is weakened, since deferred pensions will receive mandatory inflation protection. If this section of Bill 170 is retained, then the prescribed conditions on the deferred life annuity would have to be expanded to include mandatory inflation protection, whether retroactive or for future service only.

TABLE 6.1

PENSION BENEFIT ACCRUED (AS A FRACTION OF WAGE) FOR MEMBER OF A REPRESENTATIVE PENSION PLAN*

	No Inflation**		High Inflation**			
			Nominal Pension Benefit		Fully Indexed Pension Benefit	
Age	Early Entrant	Late Entrant	Early Entrant	Late Entrant	Early Entrant	Late Entrant
45	0.10	0.00	0.01	0.00	0.03	0.00
46	0.10	0.00	0.02	0.00	0.03	0.00
47	0.11	0.16	0.02	0.01	0.04	0.03
48	0.12	0.09	0.02	0.01	0.05	0.02
49	0.12	0.09	0.03	0.01	0.06	0.02
50	0.13	0.10	0.03	0.01	0.07	0.03
51	0.14	0.10	0.04	0.02	0.08	0.04
52	0.15	0.11	0.04	0.02	0.09	0.05
53	0.16	0.12	0.05	0.03	0.11	0.06
54	0.17	0.13	0.06	0.03	0.13	0.07
55	0.18	0.13	0.07	0.04	0.16	0.08
56	0.19	0.14	0.09	0.05	0.19	0.10
57	0.21	0.16	0.10	0.06	0.22	0.12
58	0.22	0.17	0.12	0.07	0.26	0.15
59	0.24	0.18	0.15	0.09	0.31	0.18
60	0.26	0.20	0.17	0.10	0.37	0.22
61	0.29	0.21	0.21	0.13	0.44	0.27
62	0.31	0.23	0.25	0.15	0.53	0.32
63	0.34	0.25	0.30	0.18	0.63	0.39
64	0.38	0.28	0.35	0.22	0.76	0.48
65	0.41	0.31	0.43	0.27	0.91	0.58

* Details of the pension plans are as follows: 1) the benefit is nominal and equals 1.4% of final 3-year average earnings up to YMPE and 2% for earnings in excess of YMPE; 2) normal retirement age is 65; 3) vesting is after 2 years of service; 4) early retirement is at age 55 and 10 years of service, with actuarial reduction of accrued benefits;
5) there is no special retirement provision; 6) if member opts for postponed retirement, benefits continue to accrue but previously accrued benefits are not actuarially increased.

** The real rate of interest is 3% and the rate of growth of real wages is 2%. The rate of inflation is zero in the 'No Inflation' scenario, and 10% in the 'High Inflation' scenario. The early entrant commences employment with the sponsoring firm when he is age 30. The late entrant commences employment with the sponsoring firm when he reaches ages 45.

VII ADDENDUM: TWO ISSUES RAISED IN THE SYMPOSIUM OF 15-16 JULY, 1987

A Index-Linked Mortgages: Payments are Reduced if the Inflation Rate is Negative

If full inflation protection subject to a deductible or partial inflation protection is mandated, the Task Force might wish to address explicitly the way that the formula will operate if the inflation rate is negative. A negative inflation rate, as measured by the consumer price index, last occurred in 1953 (Table 3.1).

This issue is highlighted by the previous discussion of index-linked mortgages (ILM's) as an appropriate vehicle for hedging a fully indexed pension benefit or a pension benefit which receives full inflation protection subject to a deductible. If the inflation rate is negative, the payments received by the investor in ILM's will be reduced, so as to produce the indicated real yield. (This is true, as well, for the index bonds issued in the United Kingdom.) At present, the stream of nominal payments under the ILM rises at the inflation rate less 2 per cent, to reflect an intended downward 'tilt' of 2 per cent per year in the real stream of mortgage payments. If the inflation rate is minus one per cent, the stream of nominal payments will decline by 3 per cent, and so forth. If the inflation rate were always positive, a plan sponsor could hedge a fully indexed pension by investing in a portfolio of ILM's. If the inflation rate might turn negative, the plan sponsor could hedge a fully indexed pension by holding ILM's only if the value of the pension also declined when the inflation rate turned negative.

B Full Inflation Protection Subject to a Cap

The possibility that the Task Force might wish to consider a new option, full inflation protection subject to a cap, has been raised. This option, too, merits economic analysis.

At present, inflation protection provided the pensions of civil servants (and teachers) in Ontario equals 100 per cent of the inflation rate, to a cap of 8 per cent. Of the few plans in the private sector which have contractual inflation protection linked to the consumer price index, it is apparently common for these increases to be limited in any one year to, say, 2 per cent or 3 per cent (Statistics Canada, Pension Plans in Canada 1980, page 59).

If inflation protection is full subject to a cap, the relevant question is whether the inflation rate is likely to exceed the cap. If so, the real value of the pension will decline. Further, the magnitude of the decline will be open ended. (From the perspective of the plan sponsor, the presence of the cap serves to eliminate this open-ended commitment.) From the viewpoint of the plan member, there is substantial inflation risk, even if the expected rate of inflation is less than the cap. As previously noted, no economist can predict the future inflation rate with any degree of confidence. Stated differently, the future rate of inflation, especially over the long-term, is inherently 'non-forecastable'.

If the cap is modest, such as 4 per cent, so that there is a high probability that inflation will exceed the cap in any given year, then the real stream of pension payments will be highly uncertain. Further, the design of the inflation protection formula is such that the plan member bears all of the risk associated with a dramatic rise in the inflation rate. From insurance principles, this seems unattractive, especially if the plan sponsor is better suited to bearing (or is able to shed) inflation risk.

In short, full inflation protection subject to a cap, unless the cap were very high, would provide the plan member with a pension whose real value would be quite uncertain. Allowing inflation in excess of the cap to be 'carried forward', so that pensions could subsequently rise when inflation fell short of the cap, would only moderately reduce this uncertainty. This is due to the fact that the inflation rate is highly positively correlated (Chapter III, page 22). Thus a 'bad' draw on inflation is more likely than not to be followed by a subsequent 'bad' draw, and so on. If the inflation rate rises above the cap in one year, it is likely that the inflation rate will exceed the cap in the following year, and so on. This persistence in the inflation rate increases the degree of uncertainty regarding the real value of pensions protected by this formula. Even if inflation in excess of the cap is carried forward to provide subsequent adjustments, in years in which inflation is less than the cap, the real values of pensions protected by this formula are likely to remain quite uncertain.

To compare full inflation protection subject to a cap with an alternative formula, one must choose an alternative which is indeed ‘comparable’. It is useful, in this regard, to compare two inflation protection formulas which have the same degree of tilt, given the forecast rate of inflation.

Consider, for example, the case in which full inflation protection subject to a deductible of 2.5 per cent is the alternative formula. If the expected inflation rate is 5 per cent, the real value of pensions so protected will decline at an expected rate of 2.5 per cent per year. Full inflation protection subject to a cap of 2.5 per cent would produce the same expected tilt in the real value of pensions; that is, an expected decline of 2.5 per cent per year.

Which of these would a plan member prefer, if the plan member wished to reduce uncertainty regarding the real value of future pension payments? If inflation unexpectedly increased, there would be no additional reduction in the real value of pension payments if pensions receive full inflation protection subject to a deductible. With full inflation protection subject to a cap, there would be a further reduction in the real value of pension payments. If inflation unexpectedly declined, there would be a reduction in the rate of decline in the real value of pensions which receive full inflation protection subject to a cap. If the inflation rate remained above 2.5 per cent, there would be no such reduction with full inflation protection subject to a deductible of 2.5 per cent.

A fundamental lesson from economic analysis is that individuals are risk averse, and thus will weigh more heavily a negative outcome than a positive outcome of equal magnitude. This lesson, and the re-inforcing perspective from insurance principles, suggests that well-informed plan members would prefer full inflation protection subject to the deductible.

Finally, one can argue - probably persuasively - that plan members would prefer full inflation protection subject to a cap of, say, 8 per cent to full inflation protection subject to a deductible of 2.5 per cent. Yet to make this comparison is to risk comparing ‘apples with oranges’. Only if the expected inflation rate over the long-term is 10.5 per cent will the expected values of the two streams of real pension payments - and hence their expected costs - be the same. If the expected inflation rate is less than 10.5 per cent, the expected value of the stream of real pension payments will be higher with full inflation protection subject to a cap of 8 per cent. Plan members may well prefer full inflation protection subject to this cap, in spite of their open-ended exposure to a dramatic increase in the inflation rate.

APPENDIX A: IMPLICATIONS FOR THE CAPITAL MARKET OF INTRODUCING MANDATORY INFLATION PROTECTION

If mandatory inflation protection is introduced, either linked to the consumer price index or through 'excess' investment earnings, the investment incentives facing plan sponsors may change. If so, there could be repercussions for the capital market as a whole. If a large number of plan sponsors choose to terminate their defined benefit plans and to replace them with money purchase plans, there could be even more dramatic repercussions on the capital market.

The purpose of this Appendix is to sketch the economic forces that are likely to be set in motion as a result of a shift in the preferences of pension fund managers, at least with respect to reserves established for inactive plan members, to which inflation protection would apply. The analysis is designed to provide a framework in which more precise questions can be posed, and perhaps answered. Quantitative evidence on the size and prospective growth of pension fund reserves, especially for inactive plan members, would be a useful complement. So, too, would be a set of responses from leading pension fund managers and plan sponsors, as to their anticipated reactions to the introduction of mandatory inflation protection.

To anticipate, the presumption of mainstream economic analysis is that the 'invisible hand' of the market will mitigate any impact on the risk-return relationships that prevail in the Canadian capital market, and hence on the relative positions of those seeking to raise either short- or long-term capital. By sketching the operation of the 'invisible hand', this Appendix seeks to clarify the role of economic forces. In so doing, the discussion may help focus the arguments of those who are less confident about the ability of the market to accommodate a potential change in the preferences of this important set of investors.

The first task is to assess the possible impact on the capital market of changed investment incentives, assuming that the number of defined benefit plans is unchanged. This is followed by a brief analysis of the impact of a possible shift from defined benefit to money purchase plans.

To assess the potential impact on the capital market, it is useful to focus on the risk-return relationships that are the central feature of capital market equilibrium. If investment incentives change for pension fund managers, at least with respect to pension fund reserves established for inactive employees (terminated vesteds and retireds), there exists the possibility that risk-return relationships might change. This issue, and certain of its implications, are explored below.

As previously noted, the introduction of full inflation protection subject to a deductible will create a strong incentive for the employer to limit the plan's exposure to inflation risk. In the absence of index bonds or mortgages, the sponsor can best achieve this result by investing the pension fund reserve established for inactive workers in short-term securities such as variable rate mortgages, commercial paper and Treasury bills. If partial inflation protection (such as 60 per cent of the inflation rate) is introduced, the sponsor will have a much weaker incentive to realign the pension fund reserve, since the plan's exposure to inflation risk will be far less. If an 'excess' earnings approach to inflation protection is mandated, then the guide rate, if it is to be uniform, should be the interest rate on very short-term debt instruments. (This presumes that the objective of mandatory inflation protection is to reduce uncertainty about the real value of promised pension payments.)

For these reasons, it is instructive to pose the following question. If pension fund managers seek to increase the proportion of funds invested in short-term securities, how will risk-return relationships be affected? For example, will the return required by investors on long-term debt and equities rise, even if their risk is unchanged, as a consequence of the change in investors' preferences? If so, then those firms seeking long-term capital will find that they can do so, but only at increased cost.

If a significant number of plan sponsors sought to minimize their risk exposure by holding short-term securities, the following factors would come into play. The equilibrium return on short-term securities would initially fall. This, in turn, would entice at least some borrowers to target a larger fraction of their debt offerings to this maturity. The decline in the equilibrium return on short-term securities would also be limited by the fact that, as the opportunity cost of holding short-term securities rose, more plan sponsors would opt for less or no 'immunization'. Undoubtedly, at least some plan sponsors would elect to shed inflation risk, even if the opportunity cost of doing so were to increase. This opportunity cost is the difference in the expected return on a portfolio that would otherwise be held less the expected return on a portfolio of short-term securities. In effect, the shedding of inflation risk involves the replacement of long-term, fixed-income securities (which can be used to immunize portfolios if pension benefits are nominal) with short-term securities.

How relevant is the above scenario? To answer this question, one would have to determine, first, the extent to which pension fund managers would indeed realign their portfolios, especially if the opportunity cost of doing so were to increase. The answer to this question is beyond the scope of the present report. One would have to know, in addition, what market forces would be set in motion by this change in the preferences of portfolio managers. These market forces can be identified, and are discussed below.

The most important observation is that the international mobility of financial capital will limit the extent to which the risk-return tradeoffs in the Canadian capital market can be altered relative to those that prevail, in particular, in the United States. A like comment applies to the term structure of interest rates, and thus in the ability of long-term interest rates to rise relative to short-term interest rates.

Further, the repercussions of this particular ‘shock’ to the capital market, relative to other potential shocks, must be kept in perspective. If the Government of Canada were to signal, through a combination of rising federal deficits and expansionary monetary policy, a reduced commitment to price level stability and/or to maintaining the foreign exchange value of the Canadian dollar, long-term interest rates could rise sharply and become more volatile, as in the early 1980’s. If so, the difficulties faced by Canadian firms in raising long-term capital are likely to far outweigh those that might be associated with any realignment in pension fund portfolios.

Finally, the capital markets in Canada and abroad have shown a remarkable ability in recent years to produce new financial products in response to the changing needs of borrowers and lenders. These market forces will cushion the impact of a changed set of investment preferences by pension fund managers. In this regard, it is useful to note that index linked mortgages have already been introduced, in a modest way, into the capital market by the Co-Operative Housing Foundation in conjunction with the Canada Mortgage and Housing

Corporation.

If a significant number of sponsors were to terminate their defined benefit plans and replace them with money purchase plans, and if money purchase plans were to invest in a different mix of financial assets, a parallel concern would arise. Would this effective shift in the investment preferences of a significant number of market participants alter existing risk-return tradeoffs?

To an economist, the natural response, once again, is to identify the market forces that would be set in motion by this shift in preferences. The important role of international capital movements would again merit emphasis. So, too, would the response of resident participants in the Canadian capital markets once the initial impact of this shift had been felt. Suppose, for example, that short-term interest rates began to fall relative to long-term interest rates, and that the required rate of return on stocks began to rise. Then other participants in the capital market, including the sponsors of defined benefit plans, would have an increased incentive to invest in long-term bonds and stocks, given the hypothesized increase in their expected return with no commensurate increase in their risk. In addition, the members of money purchase plans, or their employers, would have an incentive to re-evaluate their portfolio strategies, in light of the changing risk-return tradeoffs. One could not, as a general rule, assume that the traditional allocation of funds by money purchase plans, including RRSP's, would be unaffected if risk-return tradeoffs were to change.

In general, the presumption of mainstream economic analysis is that the 'invisible hand' of the market will mitigate the impact on risk-return relationships, and hence on the relative positions of those seeking to raise short- or long-term capital.

If there were a dramatic response to the introduction of mandatory inflation, such as a sharp drop in the number of defined benefit plans without a commensurate increase in the number of money purchase plans, there could be more draconian changes to the retirement income system. Suppose, for example, that there is an important 'forced savings' component in employer-sponsored pension plans. The reduction in employer-sponsored plans, and hence in institutionalized personal savings, will not be matched fully by a corresponding increase in discretionary personal savings. The net drop in personal savings would presumably cause some upward pressure on interest rates, although such upward pressure is likely to be mitigated by international capital flows. Because of the decline in personal savings, at least some of which would be targeted for retirement, there might be increased political support for the expansion of public pension programmes, such as the Canada Pension Plan (CPP). The predisposition of most observers is to finance the CPP on a pay-go basis. If this were done, there could be a further decline in discretionary personal savings, as individuals felt that the provision of additional public pension benefits reduced the need for private saving. Although international capital flows would again limit the rise in domestic interest rates, a consequence would be an increased reliance on foreign capital, with the attendant likelihood that foreign ownership (or, at least, influence) would also increase.

NOTES

1. In 1986, for example, the return on a portfolio of Treasury bills was about 8 per cent. The cost-of-living adjustment would thus equal 8 less 4.5 per cent. The inflation rate in 1986 was slightly above 4 per cent.

2. In 1984, 0.3 per cent of members of private sector plans in Canada were in plans that provided for the full indexing of pension benefits. Only 6.0 per cent of members of these plans were in plans that provided for partial indexing. See Statistics Canada, 'Pension Plans in Canada 1984' (Catalogue 74-401, 1986), Table W, page 52.

3. At present, the Institute for Policy Analysis at the University of Toronto is projecting that the inflation rate in Canada, as measured by the CPI, will average about 5 per cent during the next fifteen years.

4. Typical actuarial practice is to first establish the real interest rate, and then 'add' the inflation rate to obtain the nominal interest rate. This nominal interest rate is used to discount the promised stream of pension payments. If the real interest rate is 3 per cent and the assumed inflation rate is 5 per cent, the discount rate will be (approximately) 8 per cent. If partial inflation protection is equal to 60 per cent of the inflation rate, the pension will be escalated at 3 per cent per year. Discounting this escalating stream of payments by the nominal interest rate yields a net discount rate of 5 per cent. If this exercise were repeated for an assumed inflation rate of 10 per cent, the pension would be escalated at 6 per cent per year, the nominal interest rate would be 13 per cent, and the net discount rate would rise to 7 per cent. In turn, this would imply a reduction in the contribution rate required to fund the promised pension benefit.

5. In the previous example, the real value of the pension is expected to decline at an annual rate of 2 per cent when the inflation is 5 per cent, and at an annual rate of 4 per cent when the inflation rate is 10 per cent.

6. Empirical evidence on this issue is presented later in this study.

7. The actuarial cost study undertaken for this Task Force employs a real interest rate of 3 per cent, regardless of the type of inflation protection that is to be provided. As the degree of inflation protection improves, as measured by a reduction in the degree of uncertainty regarding the real value of the pension, this real interest rate should be reduced. A plan sponsor who wished to hedge this pension liability would have to hold a portfolio whose expected real return would be commensurate with its lower risk. This is most evident if the only investment strategy available to hedge the 'indexed' pension benefit is a portfolio of short-term securities such as Treasury Bills. For a detailed explanation of this economic reasoning, see James E. Pesando, 'Valuing Pensions (Annuities) with Different Types of Inflation Protection in Total Compensation Comparisons', Canadian Journal of Economics, August 1984.

8. The role of indexed financial instruments, including the Indexed Linked Mortgages (ILM's) issued by the Co-operative Housing Foundation of Canada, is assessed later in this study.

9. The lower real interest rate is the appropriate costing assumption even if the sponsor chooses not to hold this portfolio. If the sponsor chooses to hold a riskier portfolio in anticipation of a higher real return, then the higher expected return equals the compensation set by the market for the sponsor's willingness to assume this additional risk. From the perspective of the member, the real value of the pension is certain, and the only way the member could replicate this certainty would be to hold a low-risk portfolio with a 'near-certain' real return.

10. If the policy initiative is retroactive, the plan member receives - in effect - an enrichment of prior service credits. In competitive labour markets, employers could not extract future wage concessions for a benefit that the plan member has already received, and which must be paid even if the member quits or the sponsor subsequently terminates the plan.

11. For other assets, such as equities, a similar response should occur. The (non-observable) nominal return on a portfolio of stocks should rise by an amount equal to the increase in the inflation rate, leaving unchanged the real return that is anticipated by investors.

12. Efficiently diversified portfolios will, in general, hold all three assets. Based on the figures for the later subsample, a portfolio comprised of bills, bonds and stocks in the proportions 0.50, 0.25 and 0.25 will have a mean real return equal to 2.99 per cent with a standard deviation of 5.61 per cent.

13. Technically, the first order serial coefficient of the real return on bills is 0.666, with a standard error of 0.099. The first order serial coefficients for long-term bonds and stocks are 0.194 and 0.177, respectively. Similar results were obtained in the later subsample.

14. See Z. Bodie and J. Pesando, 'Retirement Annuity Design in an Inflationary Climate' in Z. Bodie and J. Shoven (editors), Financial Aspects of the United States Pension System (Chicago, University of Chicago Press for the NBER, 1983) for a detailed discussion of this issue, based on inflation experience in the United States.

15. See, for example, James E. Pesando, The Use of 'Excess' Pension Fund Earnings to Provide Inflation Protection for Private Pensions, Ontario Economic Council, Discussion Paper Series, 1983.

16. The excess interest approach outlined by CAPSA, and embodied in the 1982 Green Paper, proposed as the guide rate the average interest rate on long-term Canada bonds over the most recent five years. The CAPSA approach has been widely criticized, by practitioners and academics. In the present context, one need only note that a plan sponsor could not

shed investment risk by holding long-term Canada bonds in the pension-fund reserve, because the guide rate to define excess earnings is the *interest rate* on long-term Canada bonds, not the *return* (i.e., inclusive of capital gains or losses) on these bonds. This result is easy to understand. If the long-term interest rate increased, the guide rate - and thus the measure of excess earnings - would increase too. However, the actual return on a portfolio of long-term Canada bonds would decrease because of the attendant capital losses. If the plan sponsor held the benchmark portfolio, the sponsor would in effect be required to underwrite this capital loss. For a detailed review of the CAPSA proposal, see James E. Pesando, 'An Economic Analysis of the Green Paper Proposals for the Reform of Employer-Sponsored Plans', in David W. Conklin, *et*. *al*. (editors), Pensions Today and Tomorrow: Background Studies (Toronto: Ontario Economic Council, 1984).

17. See, again, Bodie and Pesando (1983). In their analysis, Bodie and Pesando show the amount in the 'bank' at the end of 15 years, based on different portfolio assumptions, base rates, and inflation rates. Of more interest in the present context, but beyond the scope of the present paper, is the need to translate the inflows and outflows from the 'bank' into the sponsor's earnings statement, in the context of existing funding and accounting rules.

18. At present (20 May 1987), the inflation rate is about 4.5 per cent and the nominal interest rate on Treasury Bills is about 8 per cent. Thus the 'excess' earnings using a base rate of 3.5 per cent would be 4.5 per cent, which is about equal to the inflation rate.

19. I am indebted to Laurence Coward and to Yves Guerard for providing this information.

20. Technically, the guide rate equals (1 + X)   1.02 where X is the 5-year average interest rate on the long-term Canada bonds.

21. See James E. Pesando, 'Valuing Pensions (Annuities) with Different Types of Inflation Protection in Total Compensation Comparisons', Canadian Journal of Economics, XVII: No. 3 (August 1984).

22. See, for example, the Report of the Task Force on Retirement Income Policy to the Government of Canada 1979, Volumes I and II.

23. For a representative contribution to this debate, see James E. Pesando and Stuart M. Turnbull, 'The Time Path of Homeowner's Equity under Alternative Mortgage Instruments: A Simulation Study', Housing Finance Review, January 1985.

24. Two ILM's were made at a real interest rate of 4 per cent, but I am advised by Jack Smugler of the Foundation that these loans were taken up by a provincial government, and that the 4 per cent was not a true market rate.

25. These comments are based on discussions with Jack Smugler and Nick Van Dyk of the Co-Operative Housing Foundation.

26. Spokespersons for the Co-Operative Housing Foundation indicate that they expect the real interest rate of ILM's to fall further, perhaps towards 4 per cent.

27. As noted, the stream of nominal payments under the ILM rises at the inflation rate less 2 per cent, so the real value of mortgage payments declines at a rate of 2 per cent per year. The inflation rate that is used to set the annual interest rate and the corresponding monthly payments is lagged six months. A program of mandatory inflation protection linked to the CPI could incorporate an adjustment lag greater than, equal to, or less than 6 months. Because the real interest rate on an ILM is known in advance if the ILM is held to maturity, the sponsor could, of course, hedge a fully indexed annuity. To match the cash flows required for a fully indexed annuity, however, would require the sponsor to adopt a more complicated strategy than a simple once-and-for-all purchase of an ILM. If pensions are fully indexed, and the present value of an equivalent amount of ILM's will produce cash flows which are initially too large and which are subsequently too low.

28. The P.C.O. sets forth, in addition to the prudent person test, a set of restrictions on fund investments designed, for example, to ensure adequate diversification. These restrictions do not appear to limit the ability of a plan sponsor to invest in a portfolio of ILM's, although this issue may merit explicit clarification.

29. See William M. Mercer Ltd., Report for the Treasury Board on the Financial Position of the Public Service Pension Arrangements, Inflation Adjustment Methods, Investment Strategy and Plan Management, December 6, 1985, p. 1B-1.

30. In his Report to the House of Commons on Public Service Pension Reform, delivered June 25, 1986, Treasury Board President, Robert de Cotret, noted (page 4):

> 'The rate of return being earned by the assets of a pension plan is the key to determine the amount to be contributed for accruing benefits... the present notional investment of the public service funds in long-term Government of Canada bonds has meant the plans have been credited with interest rates which are lower over time than the rates of return earned by plans invested in the capital markets.'

31. In a report for the Treasury Board (endnote 29), William M. Mercer Limited notes: 'we are working on the premise that the excess interest formula should, in the long run, produce benefit improvements comparable in amount if not timing (italics added) to those developed by the existing CPI formula' (page 1B-9). Subsequently, the Mercer report (page 1B-12) refers to the fact that 'potentially substantial variations in the timing of increases pose a number of practical problems - primarily for the par-

ticipants, due to the lack of predictability of increases.' In effect, the Mercer report equals the absence of 'tilt' with long-run inflation protection that is complete, although there may be substantial year-to-year variations in the fraction of inflation that is offset through the 'excess' interest formula. This treatment appears to mirror that adopted by the Treasury Board.

32. In its Report, Mercer's also raises the possibility of using a moving average of returns to help smooth 'excess' earnings and thus inflation adjustments. It is not clear at the present time if this is the intention of the Pension Management Board.

33. If pensions represent deferred wages, then employees - whether in contributory or non-contributory plans - forgo cash wages or other benefits in return for their accruing pension credits. To economists, the distinction between contributory and non-contributory plans is less important than it appears to be to employee benefit consultants and to legislators.

34. Section 40(1) of Bill 170 provides that if the commuted value of a pension accrued prior to January 1, 1987 is less than the value of the plan member's own contributions plus interest, then the member is entitled to have the deferred pension increased so that the commuted value is equal to the value of own contributions plus interest. In other words, for service prior to January 1, 1987, the employer's contribution can never be less than zero.

35. Statistics Canada, Pension Plan in Canada 1984 (Catalogue 74-401, Biennial), page 17. In 1984, only 0.9 per cent of members of public sector plans were in non-contributory plans.

Inflation Protection and Economic Security in Retirement

Frank T. Denton and
Byron G. Spencer

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Inflation Protection and Economic Security in Retirement

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I INTRODUCTION

This study is concerned with the effects of inflation on the purchasing power of an employment-based pension and with alternative schemes that might be adopted to offset those effects. In order that the severity of inflation effects might be better judged and the choice of a protection scheme better informed, the study is concerned also with a range of related issues. In broad terms, these include the general economic circumstances of the elderly population, the question of whether the 'needs' of older people vary with age, the availability and appropriateness of alternative statistical measures that might serve as standards for the indexing of pensions, and the uncertainty attaching to the future course of inflation. The schedule of the Task Force necessarily imposed a limit on the time available for the study and it has therefore not been possible to probe all of these issues in as much detail as we might otherwise have preferred. However, we have tried to do as much as we could in the way of providing a statistical foundation for assessing the issues, and at the very least an informed discussion.

The perspective adopted for the study is that of a pensioner. The system that provides economic security to the elderly is the de facto result of a complicated set of interactions among legislative requirements, individual initiatives, public and private policy decisions, administrative procedures, and the workings of the economy at large. There are various players and various interests involved. Any change in the terms of agreement under which pension benefits are paid involves, implicitly or explicitly, some redistribution of economic resources, and hence some conflict of interest. The liberalization of a retirement pension plan, whether by inflation protection or other means, implies a transfer of resources to the elderly members of society from somewhere else in the system, and understandably therefore is regarded with more favour by some and less by others. One can look at pension issues from several points of view -- the employer, the provincial or federal government, the manager of a pension fund, the union engaged in collective bargaining, the young worker, middle-aged worker, or older worker, and the individual pensioner. Our contribution is to look at the issues from the point of view of the individual pensioner. To some extent that is also the point of view of the worker who will someday himself be a pensioner but the interests of the two may not exactly coincide; the interests of younger workers, as they perceive them, may in fact be quite different from those of present-day or soon-to-be pensioners.

The study builds in part on earlier work carried out with our colleague, Dr. Melvin Kliman (Denton, Kliman, and Spencer, 1981). We have been able to bring some of the earlier work up to date, in the sense of incorporating statistical data that have become available in the past few years, but limitations of time have prevented us from doing that in all cases. In particular, we have not been able to redo the lifetime simulations of hypothetical typical individuals (taking account of personal income taxes and lifetime employment experience) that were reported in the earlier study. On the other hand, we have extended the work reported there in a number of ways, giving special attention of course to those matters that are most directly related to inflation and inflation protection. In any event, the earlier study has relevance for the present one; we have drawn on it, where appropriate, and refer the reader to it for additional information.

The sequence of topics dealt with here is as follows. Section II offers a general discussion of the issues that we think important in evaluating the need for inflation protection and the manner in which such protection might be provided. Section III draws on available statistical data to summarize the income and asset positions of the elderly population and the extent to which economic circumstances vary within that population by age. Differences in the expenditure patterns of the elderly, by age, are investigated in Section IV; both differences in total expenditure and differences in the allocation of the total among broad categories (food, shelter, etc.) are considered. The impact of inflation on the elderly is assessed in Section V by constructing special price indexes for that population; the movements of these indexes are then compared with the movements of the overall Statistics Canada consumer price index to see whether the latter provides an adequate measure of inflation effects on the pensioner population. A wider range of possible indexing standards is surveyed in Section VI, including various price and wage-related series. Alternative types of inflation protection formulas are set forth and discussed in Section VII and the implications of adopting these formulas are assessed in Section VIII by reporting the results of a large number of computer simulation experiments designed to take account of the uncertainty associated with future rates of inflation. A summary of the study and a statement of its principal findings are provided in Section IX. Technical details relating to Sections IV, VII, and VIII are supplied in a set of Appendices not reproduced with this report, but available from the authors on request.

II ISSUES RELATING TO INFLATION PROTECTION

There are various issues that present themselves for consideration when one starts to think about the effects of inflation on pensioners and how protection against those effects might be provided. The issues with which we are concerned here are the ones of relevance from the pensioners' point of view; issues of relevance from the points of view of employers, pension fund managers, and other interested groups need to be taken account of too, of course, but they are not of concern in the present study. Some of the issues noted below are treated in detail in later sections and some are not, either because of lack of data or because of lack of time. Our aim is to provide a comprehensive discussion of the issues before turning attention to those on which the study is principally focused.

A How Great a Threat is Inflation to the Elderly Pensioner?

The future course of inflation is unknown and unknowable. However, the historical record can be used to make estimates of the probabilities of different inflation rates. Such estimates form the basis of the calculations discussed in Section VIII.

A summary impression of what inflation can do to the purchasing power of a pension with no compensation for price increases is obtained by noting the following. Between 1966 and 1976 the average annual rate of increase in the Canadian Consumer Price Index was 6.0 percent; between 1976 and 1986 it was 7.7 percent. On this basis, the purchasing power of a pension for someone who retired at age 65 in 1966 would have fallen by 44 percent by the time the pensioner was 75, with no inflation protection, and by 73 percent by the time he or she was 85. In practice, some measure of protection already exists: CPP, OAS, and GIS payments are fully indexed, and some employment pensions are either fully or partially indexed, either by formal agreement or as the result of ad hoc year-to-year adjustments. There are also some offsets in the form of partially indexed income tax brackets and tax exemptions. The above calculated losses of purchasing power are thus overstatements. However, even if the losses were only half as great they would still be devastating; for the average pensioner with little or no protection the historical record suggests that inflation is indeed a major concern.

Further light is thrown on the matter by reference to earlier work. Based on computer simulations of lifetime working experience, a more or less typical employment pension plan with no indexing, the 1978 income tax schedule, and some other assumptions, it was calculated that a middle-income married couple would experience a reduction of 21 percent in its level of consumption in the first year after the husband's retirement, compared with the preretirement level. With an annual inflation rate of 7 percent, the couple's consumption would then be reduced by another 19 percent after ten years and 32 percent after twenty. These results allow for both tax effects and the full indexing of federal government transfer payments. They also assume that the husband is fully covered under a pension plan over the whole of his working life. The data on which the simulations are based are now somewhat out of date but it seems very unlikely that more recent data would alter in any significant way the conclusion that the overall effects of inflation can be very severe when an employment pension is unprotected. (For details and the results of simulations under alternative assumptions, see Denton, Kliman, and Spencer, 1981, Chapters 4 and 5.) This has of course been recognized by the Government of Ontario in its decision to implement some form of protection.

B The Choice of a Formula: How Much and What Kind of Protection?

Given that the need for inflation protection has been accepted, the obvious next questions are how much and what kind. Three categories of protection formulas have received particular attention: (1) formulas based on price indexing; (2) formulas based on wage indexing; and (3) formulas based on a criterion of pension fund excess earnings. Many variations are possible within these categories: indexing may be full or partial; it may come into play only when the rate of increase of the indexing series exceeds some floor level (e.g., 2 percent per annum); it may be applicable only when the rate of increase is below some upper limit; the degree of indexing may vary in some manner with the rate of increase; there may be time lags in index-based adjustments; and so on. We discuss the basic formulas in Section VII and test a number of particular variations of them in the series of simulation experiments reported in Section VIII.

C The Choice of an Indexing Standard

If an index-based formula is chosen, there is still the question of exactly which series to use as the index. One would of course want the series to be widely accepted as reliable and appropriate.

Among price series, the one that comes immediately to mind is the Canadian Consumer Price Index, which is compiled and released monthly by Statistics Canada. However, there are others. Relevant questions are whether an all-Canada index is appropriate for Ontario, and whether an index covering the population of all ages is appropriate for the older population. Among wage or wage-related series, the most likely choice would seem to be one of the average weekly earnings series provided by Statistics Canada. In this case, series are available specifically for Ontario but there are still some choices to be made.

The question of whether the Canadian CPI properly measures the rate of inflation for the older population is taken up in Section V; special price indexes are calculated for elderly consumers and compared with that series. The wider range of possible indexing standards is discussed in Section VI, attention being given to the availability and characteristics of various series. The point to note at the moment is that a recommendation for the adoption of a particular indexing formula calls for specific identification of the series to be used as the standard.

D Should Pensioners Share in the Gains from Economic Progress?

By ‘economic progress’ we mean increases in the general productivity of the economy associated principally with the development and application of new technology. Should pensioners share in these gains? The gains are directly evident in the work place but their origin may be elsewhere -- in basic research carried out in the universities, in improvements in knowledge and skills conveyed through the tax-financed educational system generally, in new technology introduced from abroad. The working population and its dependents share in the gains through higher general wage levels. Should the retired population also share?

The question is not primarily an economic one; it is political or ethical. What makes it so important in the present context is that the answer to it bears directly on the choice between price indexing and wage indexing. Full indexing for price changes would maintain the same absolute purchasing power as when a pensioner retired. Indexing for wage changes would, broadly speaking, maintain the same relative purchasing power.

Suppose, for example, that the general price level rises at 7 percent per year and the general wage level at 8 percent, implying a 1 percent per annum gain in real wages. A pension fully indexed for price change would have the same absolute purchasing power ten years after retirement, but relative to the general standard of living (as reflected in the wage level) its purchasing power would have declined by 9.5 per cent. Twenty years after retirement its relative purchasing power would have declined by 18 percent. (Wages may, of course, increase more slowly than prices in particular years; however, in the long run there is a presumption that they will increase more rapidly -- that real wages will rise, that is to say.)

The issue of whether pensioners should or should not share in the longer-run gains to society from increased economic productivity seems to us quite fundamental to the decision about what kind of inflation protection formula to adopt.

E Initial Comprehensive Introduction or Phasing In?

Should the protection formula apply to all pensioners from the beginning or should it be phased in? If the formula were to be phased in, one possibility is that it would apply only to new pensioners. Another is that it would apply in full to new pensioners and in reduced form to existing ones. An alternative form of phasing-in would have the formula apply equally to all pensioners, but be introduced gradually over a period of years. Yet another form would have the formula apply only to new pensioners and be introduced in steps: the first cohort of new pensioners would be subject to a fraction of the inflation adjustment provided for under the formula; the second cohort would be subject to a larger fraction; and so on, until the formula had been implemented in full. (Benefits under the Canada Pension Plan were introduced in this way, for example, being phased in for successive new cohorts over a period of ten years when the CPP came into effect in the 1960s.) The latter would obviously be the most conservative scheme; the full and immediate introduction for all pensioners would be the most liberal one.

F Who Should Bear the Burden of Uncertainty?

Great uncertainty attaches to the future course of inflation, and the question of who should bear the burden of the uncertainty naturally arises. Should it be the individual pensioner or the employer? Some protection formulas imply a sharp reduction of uncertainty for the pensioner; even though they may not fully compensate for inflation they leave the pensioner in the position of knowing, with high probability, what the annual loss of purchasing power will be. Assuming inflation at less than 2 percent per annum to be a very unlikely occurrence, a formula that provided full annual price indexing above 2 percent, for example, would leave a pensioner in little doubt as to the outlook: his pension would almost certainly diminish at a rate of 2 percent per year. On the other hand, a formula that provided an adjustment of, say, 60 percent of the inflation rate, with no minimum level, would leave the pensioner in a state of considerable uncertainty. (The same point has been emphasized by Professor James Pesando in a report prepared for the Task Force.)

An argument in favour of a formula that reduces economic uncertainty for the pensioner is that pensioners are likely to be the group least skilled in coping with it, by virtue of their lack of relevant training and experience, and in some cases their advanced age and infirmity. Business firms, on the other hand, must deal constantly with uncertainty in one form or another; indeed, choice in conditions of uncertainty is the essence of business decision-making.

We give particular attention to the issue of uncertainty in Section VIII. Based on a large number of inflation scenarios we calculate there the probabilities of future purchasing-power losses under a range of assumed protection formulas and provide also a summary measure of the uncertainty attaching to each formula.

G The Lengthening Life Span

Life expectancy has risen over the decades in Ontario, as elsewhere in Canada and other developed countries. Mortality rates have fallen more or less continuously at most ages, including the older ones. Further decreases in mortality and increases in life expectancy can be anticipated for the future, although the rates of change may be slower. A clear implication is that pensioners will live to older ages, and hence be subject to the (cumulative) effects of inflation for greater numbers of years.

The changes in expected years of remaining life for persons who reach the age of 60 or older are evident from Table 2.1. In 1931, a man aged 60 could have expected to live another 15.9 years and a woman could have expected to live another 16.9. By 1981, life expectancy had increased to 17.8 years for the man and 22.7 for the woman. There were corresponding gains at ages older than 60. Of note also is the increased gap between the expectancies for men and women: at 60 a woman can expect to live 4.9 years longer than a man of the same age, based on the 1981 data; at 75 she can expect to live 2.9 years longer. These differences are reflected in the proportion of widows in the older female population and the corresponding proportion of widow-survivors of deceased male pensioners.

Another way of looking at the implications of current survival rates is provided by Table 2.2. For selected ages in what may be viewed as the retirement range, namely 55 to 70, the proportions expected to survive to older ages up to age 85 are shown in the table, based on 1981 data. (The range 55 to 70 is chosen to encompass 'early', 'normal', and 'late' retirement.) The proportions refer to the older population as a whole, not specifically to the pensioner population. The survivor proportions may in fact be somewhat different for pensioners. In particular, a person retiring at age 55 or 60 is more likely to have a health reason for retiring, and a corresponding life expectancy that is less than the average. However, the figures do give a rough idea of the likely survival pattern of new pensioners.

H The Trend Towards Earlier Retirement

Not only has life expectancy increased, so that pensioners live longer; there has also been a marked lowering of the average age of retirement. Comprehensive figures for the proportions of workers covered by employment pension plans who retire at particular ages are not available but the trend is clearly evident from the record of changing labour force participation rates -- that is, the proportions of the population belonging to the labour force, by age and sex. Rates for men and women in the age groups 55-64, and 65 and over are shown in Table 2.3 for the period 1966-86, at five-year intervals.

The participation rates for men 65 and over have been falling for many decades, and the decline continues. The rate for men 55-64 has also fallen quite sharply in recent years, reflecting the fact that retirement before 65 is now much more common than it used to be. (In some cases earlier retirement is voluntary and in some it is involuntary, of course.) The rates for women are very low from 65 on, and not much should be read into them. The rates for women in the 55-64 range are the result of two opposing tendencies: the tendency towards greater female participation in the labour force generally, on the one hand, and the tendency towards earlier retirement, on the other.

The obverse of the participation rates -- the proportions not in the labour force -- are not perfect measures of the pensioner population, by any means. Some who are not in the labour force are not covered by employment pension plans and some who are in the labour force are drawing pension benefits while working part-time or full-time at other jobs. However, in broad terms there is no doubt about the trend towards earlier retirement, and the consequent lengthening of the period during which pensioners are subject to the effects of inflation for this reason, as well as for the reason that (on average) they will live longer.

I Do the 'Needs' of the Elderly Change with Age?

The question of 'needs' is one that has arisen frequently in discussions of inflation protection for pensioners: Do the 'needs' of the elderly change as they grow older? If people 'need less to live on' at 75 or 85 than they do at 65, do they require as much protection against inflation as would otherwise be the case?

There are several observations that can be made. The first is that 'needs' are virtually impossible to define objectively in any meaningful way, aside from a definition in terms of bare survival requirements -- basic food, shelter, etc. -- or perhaps some 'poverty-line' definition. Beyond definitions of that kind, the question of what someone 'needs' can be answered only in relative terms; it is a highly subjective concept. The difficulties were long ago recognized in economics and the term is little used in that discipline.

The second observation is that circumstances vary greatly among the elderly. To some extent that is the result of natural aging, but in large measure it is also the result of particular major events: the death of a spouse; a partially incapacitating stroke or other serious health problem; the movement to another city of an adult son or daughter who previously provided day-to-day or week-to-week assistance; and so on. Popular depiction of the elderly often makes them seem relatively homogeneous as a group, but they are not. Their health status alone makes them heterogeneous: some are in good health well into their eighties or nineties; others are in chronic care hospitals or nursing homes, or continue to live by themselves but with constant daily assistance. In terms of health, the elderly are the most heterogeneous age group in the population. Any realistic discussion of what they 'need' must take that into account.

A better question to focus on is how expenditure patterns vary with age. This question can be asked in two distinct forms: (1) How does total expenditure vary? (2) How do the proportions of the total spent on different categories of consumer goods vary? The first form requires that allowance be made for differences in assets and incomes, and the relevant issue then is whether total expenditure varies with age after making such allowance: Given comparable incomes and assets (in some sense), will an 85-year-old spend less in total than a 70-year-old? The second form of the question also requires some comparability of purchasing power; one can rephrase it and ask, 'If the 85-year-old and the 70-year-old have equal purchasing power, will they allocate their expenditures differently among different categories of goods?'

A careful investigation of age-related differences in expenditure patterns holds some promise of useful relevant information, even if it cannot address directly the question of how 'needs' vary with age. We deal with this matter in Section IV, using data available from the Statistics Canada Survey of Family Expenditures in which it is possible to identify elderly couples and individuals by age and other characteristics.

J How Well or Badly Off Are the Elderly?

An issue of relevance in evaluating any contemplated change in pension benefits is that of the general economic circumstances of the elderly. What are their income and asset positions? How do these positions change with age? Has the economic well being of the older population improved significantly in recent years? In light of the answers to such questions, how pressing is the need for inflation protection?

We investigate the income and asset positions of the elderly in the next section, using aggregate data from taxation statistics and micro-data from the Statistics Canada Survey of Consumer Finances. The available data are less than perfect for the purpose but some general inferences are possible.

K The Effects of the Tax System

How the tax system affects the purchasing power of older families and individuals is obviously relevant to an understanding of their economic circumstances and the consequences of inflation. An attempt was made in Denton, Kliman, and Spencer (1981) to take account of income tax effects in the series of simulation experiments reported in that study. It has not been possible to take explicit account of such effects in the present study but we note the issue as one that will be of interest to the Task Force.

It seems very unlikely to us that tax effects would turn out to be a major consideration in evaluating the need for inflation protection; the reductions of purchasing power consequent on 'normal' annual inflation rates are so immense when compounded over ten, twenty, or more years that they would very likely dominate by far any effects attributable to the functioning of the tax system. Nevertheless, tax effects may not be negligible. At the time of writing there is also the prospect of substantial changes in federal income tax rates and regulations which may bear in some degree on the matter of inflation protection, and on the general economic circumstances of the elderly. These too are beyond the scope of the present study.

L Senior Citizen Discounts and Subsidies

Price reductions and subsidies of one kind or another are available to persons over the age of 65, and in some cases to persons as young as 55. These include retail discounts, subsidies for drugs, subsidies for municipal transportation, hospital and medical insurance subsidies, and the like. We make no attempt to take account of them here but again note their relevance. To the extent that they are defined in proportionate terms (10 percent discount, 100 percent subsidy, for example), they are automatically indexed against price inflation.

Discounts and subsidies are no doubt of some importance in reckoning the economic position of the elderly. (This is true especially of health-related subsidies.) However, again they are likely to be dominated by the cumulative effects of inflation.

M The Effects of Pension Indexing on Saving and Work Incentives

There has arisen in the United States in the past two decades or so an extensive literature on the effects of social security on the incentives of individuals to work and save. The questions of concern are whether the U.S. social security system induces people to work less, save less, and retire earlier than they would without the system, or with a different type of system. There is also some related literature pertaining to Canada, although it is much less extensive. To some extent the concerns about social security effects have relevance for the issue of compulsory inflation protection for employment pensions. Any 'liberalization' of future retirement benefits may, in theory at least, affect the labour and saving patterns of people in their working years, and pension protection represents a form of such 'liberalization'.

We think it fair to say that in general the literature on social security effects is inconclusive. There may be some effects but their extent and how (or whether) they can be reliably measured remain matters of contention. We doubt therefore that the arguments that have been made in connection with the effects of social security on work and saving incentives need be regarded as of first-order importance in the present context.

N The Timing of Indexing Adjustments

A final issue is that of the timing of inflation adjustments under a general indexing scheme. Unless adjustments are made continuously there is always some loss of purchasing power during the intervals, assuming the rate of inflation to be positive. Annual adjustments imply a greater loss than quarterly ones; quarterly adjustments imply a greater loss than monthly ones.

As an example, suppose that the rate of inflation is 7 percent per annum and that price increases are continuous throughout the year. This implies a monthly inflation rate of about .565 percent. If pensions are price-indexed but the adjustments are made only once a year, the average purchasing power of a pension will be approximately 3 percent below what it would be if the adjustments were made each month. (The 3 percent loss is not cumulative, of course; it represents the average gap between an annually adjusted and a monthly adjusted pension in any given year.) If adjustments are made quarterly, the average loss of purchasing power will be about 0.6 percent, compared with monthly adjustments.

Lags in adjustment also imply some loss of purchasing power when inflation is continuously positive. Some lag is inevitable because the price or other indexing series is not available instantly and because of time required in the administrative process to put adjustments into effect. However, the point to note is that the longer the lag, the greater the average purchasing power loss.

TABLE 2.1

LIFE EXPECTANCIES OF THE OLDER POPULATION, 1931-1981

	Expected years of life remaining at age --					
	60	65	70	75	80	85
Men						
1931	15.9	12.7	9.8	7.3	5.4	3.9
1941	15.8	12.6	9.8	7.4	5.5	4.0
1951	16.2	13.1	10.3	7.8	5.9	4.5
1961	16.2	13.0	10.3	7.9	6.0	4.4
1971	16.6	13.4	10.6	8.2	6.2	4.5
1981	17.8	14.4	11.4	8.8	6.7	5.0
Women						
1931	16.9	13.5	10.4	7.7	5.7	4.2
1941	17.6	14.0	10.8	8.1	5.9	4.2
1951	18.6	14.9	11.6	8.7	6.4	4.7
1961	19.7	15.9	12.4	9.3	6.8	4.8
1971	21.5	17.6	14.0	10.7	8.0	5.8
1981	22.7	18.7	15.0	11.7	8.8	6.4

NOTE: Life expectancies are taken from various issues of Ontario life tables prepared by Statistics Canada.

TABLE 2.2

EXPECTED SURVIVOR PROPORTIONS FOR SELECTED AGES OF RETIREMENT, 1981

	Expected years of life remaining at age --					
	60	65	70	75	80	85
Men retiring --						
at age 55	94.0	85.2	72.9	57.2	39.2	22.0
at age 60	--	90.6	77.5	60.8	41.7	23.4
at age 65	--	--	85.5	67.1	46.0	25.8
at age 70	--	--	--	78.5	53.8	30.2
Women retiring --						
at age 55	96.9	92.2	85.3	75.3	61.2	43.0
at age 60	--	95.2	88.0	77.7	63.1	44.4
at age 65	--	--	92.5	81.6	66.4	46.6
at age 70	--	--	--	88.2	71.7	50.4

NOTE: Survivor proportions are based on 1981 Ontario life tables prepared by Statistics Canada.

TABLE 2.3

LABOUR FORCE PARTICIPATION RATES OF THE OLDER POPULATION, 1966-1986

	Percentage of population in the labour force			
	Men		Women	
	Ages 55-64	Ages 65+	Ages 55-64	Ages 65+
1966	89.3	31.0	35.1	7.2
1971	85.8	23.2	38.8	6.4
1976	80.0	17.8	37.2	4.8
1981	79.6	16.0	38.3	5.5
1986	73.0	13.0	38.4	3.5

NOTE: Participation rates are annual averages for Ontario derived from Statistics Canada Labour Force Survey data.

III THE INCOME AND ASSETS OF THE ELDERLY

However 'needs' are defined, it is clear that the ability of elderly individuals to satisfy them is related to income levels and holdings of financial and non-financial assets. We turn, therefore, to a consideration of available data to learn what we can about the income and asset positions of members of the elderly population. We pay particular attention to the ways in which the income levels of the elderly have changed over time. Insofar as possible, we attempt also to show how the incomes of various cohorts of individuals -- that is, of persons born at about the same time -- have changed as those persons have aged, moving from middle age into the pre-retirement years, and then into retirement. For this purpose we have found two sources of data to be especially helpful. The first is based on annual income tax returns and the second on survey responses obtained by Statistics Canada in its Survey of Consumer Finances.

A Incomes of Tax Filers

Summary information based on income tax returns is published in Revenue Canada's annual publication Taxation Statistics. Since not everyone files a tax return, the value reported will be somewhat higher than the average income level for the population as a whole. However, most people do file returns.

Table 3.1 shows 'average total income' (as defined for taxation purposes) of male tax filers, at five-year intervals for the period 1964 to 1984, for the six age groups 45-49, 50-54, 55-59, 60-64, 65-69, and 70 and over, as well as for all ages combined. All figures have been adjusted by the Consumer Price Index so that they are expressed in terms of 1984 dollars. From an inspection of any column of the table, we can see that income in any year is highest at ages 45-49, and falls with age thereafter. A rather different impression is obtained by looking across any row, to see how the average income of a given age group has changed over time -- income has increased for each age group from one year to the next, in most cases. (There are few exceptions -- the average income level of all but the two oldest groups declined between 1979 and 1984 when average incomes across all age groups also fell, and the level for the 70 and over group fell from 1964 to 1969, and then again from 1969 to 1974.)

A third impression results from reading diagonally across and down the table, to follow the average income experience of cohorts of individuals. For example, those in the age group 45-49 in 1964 would have been 50-54 in 1969, 55-59 in 1974, and so on. As can be seen, for such cohorts of individuals income generally does not peak at ages 45-49, but rather five or ten years later, depending on the particular cohort under consideration. Furthermore, the income declines that occur with advancing age are much less for a cohort of individuals as they age than would appear to be the case judging only from the data for any one year. This is an important observation since the actual income experience of a cohort is much more relevant to any changes in the well-being of its members than are comparisons across age groups in any given year.

It must be recognized that the experience over time does not, in fact, relate to exactly the same set of individuals: not all members of a cohort would have survived from one taxation year to the next, nor would all have filed tax returns in all the years shown; furthermore, the population of tax filers would differ from year to year as the result of both immigration and emigration. However, allowance for such considerations is likely to change the picture very little: it is clear that the income experience of a cohort over time can differ substantially from the cross-section relationships evidenced by the various age groups in any one year.

The relationship between the income experience of a cohort and a cross-section is illustrated schematically in Figure 3.1, with the use of hypothetical values. The cross-sectional sequence, indicated by the broken line GEHC, shows how incomes at various ages compare in a given year: they decline from age 50 or so, at first rather gently, then sharply at retirement and thereafter. However, the cross-section by its very nature reflects the current year's experience of many cohorts. We show two -- an earlier cohort and a later cohort (one born 10 years after the first). The earlier cohort has reached age 75 by the year of observation, and its average income level is much lower than that of the later cohort, which has reached age 65. However, ten years ago, when the earlier cohort was 65, its own average income level, while somewhat higher than its own income today, was markedly lower than that of today's 65-year-olds. The income experience of the earlier cohort from age 50 to the present is shown as the solid line ABC while that of the later one is at a higher level, DH, and will eventually (in ten years) extend to F.

Table 3.2 focuses on the income experience at ages surrounding age 65, a standard age of retirement. Specifically, average income levels are shown for those 60-64-year-old males filing tax returns in each year from 1963 to 1979, along with the averages for 65-69-year-old males filing returns five years later, from 1968 to 1984. Again, all income figures have been adjusted by the consumer price index so that they are expressed in terms of 1984 dollars. The main observation from this table is that while incomes indeed do decline with retirement, average incomes for 65-69-year-olds have fairly typically been 85 to 95 percent of what they were for (approximately) the same people five years before, when they were five years younger. However, this calculation probably understates somewhat the actual deterioration in income position over this age interval, since the percentage of males filing income tax returns is higher for 60-64-year-olds than for 65-69-year-olds and the percentage has been rising for the former and falling for the latter. We observe, however, that for the three most recent years the replacement ratios have been somewhat below the 85 percent level, for reasons that are not immediately clear.[1]

Further information about cohort income experience is provided in Table 3.3, which follows cohorts at four-year intervals from 1968 to 1984. (The cohorts are defined by year of age at the end of the taxation year and, unlike the previous tables, include women as well as men.) In 1968 a total of twenty-three cohorts are defined, ranging in age from 44 to 66; they are followed up to 1984 or to age 70, whichever came first. The greater detail presented here confirms the impression of Table 3.1 that average income levels (expressed in constant dollars) typically reach a peak when individuals are in their mid-to-late fifties or early sixties.[2]

It should be noted that the impact of inflation on the income position of the elderly has been taken into account by expressing income values in constant dollar terms. The general pattern of age-income change reported suggests, at the very least, that the average income position of the elderly did not decline relative to other age groups even with the high inflation levels during much of the data period.[3]

There is, of course, concern not only with average income levels, but also with the distribution of income and, in particular, with those in poverty. Table 3.4 focuses on the low end of the male income distribution, and shows for each of several age groups the percentages of persons who reported incomes less than one-quarter of the overall male average. The table shows that the percentage in this low income range generally increases with age. Furthermore, it appears to make relatively little difference whether or not one adopts a cohort perspective in this case, although the continued decline since 1974, and especially since 1979, in the proportion of those 65-69 and 70 and over in this low income range might be the result of improved provisions of the GIS scheme, as well as the increasingly important coverage afforded by the Canada and Quebec Pension Plans.

B Incomes and Assets as Reported in the Survey of Consumer Finances

We consider now a second source of information about income levels and asset holdings, namely, the Survey of Consumer Finances. This survey is conducted annually by Statistics Canada, and involves a probability sample of households from across the country. As compared to the information based on tax returns, it thus has the advantage of providing a more representative set of data, since the sample is not restricted to those that filed tax returns. Furthermore, it provides information on the basis of 'families' and 'unattached individuals', rather than strictly for individuals whatever their family status.

In what follows we work with the 1984 Survey of Consumer Finances (SCF), which is the latest one available. Many previous SCFs have been conducted but our work has been restricted to this latest one. Our purpose is to focus attention on the age pattern of the distribution of income and of assets.

C Family Income from the SCF

We start with Table 3.5, which shows the average income of families and unattached individuals[4], in total and by component, and separately for each of seven age groups, as defined by the age of the household head. The age groups commence with 50-54, so that the table encompasses the range of ages from pre-retirement through 'early', 'normal', and 'late', retirement. The upper portion of the table refers to all families and unattached individuals, while the lower portion refers only to families with husband and wife present. The income figures relate to the calendar year 1983. (The survey was conducted in the spring of 1984, and the asset/debt information relate to the survey date; however, the income information relates to the preceding calendar year.) Table 3.6 shows the percentage distribution of the major income components for each age group corresponding to the dollar figures shown in Table 3.5.

Not surprisingly, we find that over the age range shown total family income falls with the age of the head. It falls more rapidly than does the average total income for males filing tax returns (compare Table 3.1 with Table 3.5), but that is to be expected because of the changes in household composition that go with increasing age of the head. (A larger proportion of older households include elderly widows living alone). A somewhat better comparison is with the income levels for married couples at various ages, as shown in the lower panel; while there are changes from year to year, the age-income relationship is generally quite similar in the two tables.

Returning attention to Table 3.5, we can see here that earned income declines rapidly with age, as expected, especially after ages 60-64. The same is true of both of the components of earned income, namely income from wages and salaries and from self employment. Investment income, on the other hand, continues to rise with age up to the 70-74 age range and, in the case of married couples, even beyond, into the 80-and-over range.[5]

In addition to earned income and investment income, income is received from government sources and from private pension plans. Of the government source income, Old Age Security (OAS) and Guaranteed Income Supplement (GIS) payments are by far the most important after age 65. The continued increase in benefits with age after age 70 is explained by the fact that larger proportions of the older age groups receive the GIS component (which is income-related), whereas the OAS payment is the same for all recipients. Like the OAS/GIS payments, the Canada and Quebec Pension Plan (CPP/QPP) benefits also increase sharply after age 65. However, unlike the former, CPP/QPP benefits are approximately the same for those 70-74 as for those 65-69, and decline rapidly with age for those older. The reason in part is that in 1983 many over the age of 75 who retired at 65 or younger would not have had sufficient years of coverage to entitle them to maximum benefits; also, the maximum benefit level has increased over time. Those who reach the 75 and over age range in the future will receive higher levels of income from this source. In total, it may be observed that government source payments account for an increasingly large fraction of average income the older is the head: they represent about one-third of average income for those 65-69 and considerably more than one-half for those 80 and over.

Average income from employer pension plans, superannuation, and annuities is larger than that from the CPP/QPP for those aged 65-69 and for most older age groups, and considerably larger for those younger. The relatively high income levels received by those 60-64 is indicative of the increasingly wide coverage of private pension plans with ‘early retirement’ provisions, and suggestive of the increased importance that employees would attach to ensuring the value of their pensions in the face of inflation.

Table 3.7 also provides information about the income of families and unattached individuals, but expresses the dollar values on a per person rather than a per unit basis. This adjustment is of some interest since the size of the family unit falls, on average, with the age of the head. As can be seen, the adjustment makes a considerable difference to the interpretation of the numbers. When expressed on a per capita basis income reaches a maximum when the head is 60-64 rather than 50-54. Furthermore, while the average income of all units headed by those 80 and over is only 36 percent of that of the peak group, it is 71 percent when expressed on a per capita basis. In the case of families with head and spouse present the figures are 42 and 66 percent.

D Family Wealth from the SCF

Tables 3.8 to 3.10 show average asset holdings, in total and by major types, for the same age and family categories as before. The total assets include financial assets (deposits of various sorts, Canada Savings Bonds, stocks, etc.) and non-financial assets (owner-occupied home, other real estate, equity in business, etc.). A major exclusion is pension assets, aside from accumulated RRSP contributions, as represented by the present values of future claims on pension income, both private and public. There is no doubt that such values are very substantial, and their exclusion represents an important omission.[6] We note its importance, but restrict our attention to the available estimates. Other omissions include insurance policies and the value of collectibles (such as stamp collections and art objects) as well as the value of many consumer durables (aside from motor vehicles), all of which are likely to be less important.

As of early 1984, the average reported value of total assets held by all families and unattached individuals (the top panel) increased with age up to age 55-59 or 60-64; for older ages the average value dropped sharply with age. This pattern may greatly exaggerate the age-asset profile for cohorts. In particular, successively older cohorts will include increasingly large proportions of unattached individuals, especially single widows. Perhaps a better indication is provided by the lower panel, which describes the age differences for married couples. Here we see that assets peak at age 60-64, and then fall much less sharply with age. We would expect any age-related reduction in assets as experienced by cohorts to be still less.[7] Indeed, some authors have suggested that it does not decrease, and that in fact people continue to accumulate wealth into very old age.[8] We comment further on this below.

What of the composition of assets? Following Statistics Canada definitions, Tables 3.8 through 3.10 show total financial assets (liquid and other), the value of owner-occupied homes and other real estate, and the value of business equity. Liquid assets consist mostly of various deposits (in chequing and non-chequing accounts, as well as term deposits and saving/investment certificates) and Canada Savings Bonds, while other financial assets consist of stocks, RRSPs, RHOSPs, loans to persons, etc.

All financial assets combined account for more than 20 percent of the total assets held by those 50-54; the proportion increases with age, and is more than 45 percent for those 80 and over. It may be observed that the average dollar value of total financial assets is approximately constant across the various age groups in the case of married couples. Liquid assets account for almost two-thirds of the total financial assets held by those 50 and over; furthermore, both the proportion and the amount held in liquid form generally increase with age.

The largest single asset, on average, is the (estimated market) value of owner-occupied homes; it represents more than two-fifths of all asset holdings, a proportion that differs little across age groups. The average values of equity in business, farm or profession and in other real estate are also substantial, but decline sharply with the age of the head.

The asset values are expressed on a per capita basis in Table 3.10. We find again that the adjustment for the size of the unit is a matter of some consequence. Whereas the total value of assets held by all units (families and unattached individuals) whose head is aged 80 or over is only 51 percent of the corresponding figure for units with maximum average assets, when expressed on a per person basis the ratio is 75 percent; for families with husband and wife present the ratios are 63 and 79 percent, respectively, on the per-unit and per-person bases.

Tables 3.11 to 3.13 show the average debt and its major components, as well as net worth or wealth (total assets less total debts). Total debt includes personal debt (consumer charge accounts, bank loans, etc), and mortgage debt on owner-occupied homes. On average, for the age groups shown, total debt is very small relative to total assets (less than 5 percent); furthermore, older families or individuals have smaller debts than younger ones, both absolutely and relative to the value of their assets.

E Proportions of Families and Unattached Individuals with Low Incomes

We conclude this section with a brief discussion of the proportion of families and unattached individuals falling below the so-called '1978 low income cutoff level', as defined by Statistics Canada. The 'cutoff level' is based on the fraction of a spending unit's budget spent on 'necessities', which are defined as food, shelter, and clothing; in 1978 the average spending unit spent 38.5 percent of its income on these items. The low-income level is then set arbitrarily at 58.5 percent of the average income level -- that is, at the overall average level spent on essentials plus an additional 20 percentage points for all other things (household operation, household furnishings and equipment, transportation, health and personal care, recreation, reading, tobacco and alcohol). In determining the actual dollar amount that would represent low income for a particular spending unit, allowance is made for the number of persons in the unit and the city of residence. Allowance is made also for price changes between 1978 and 1983. The spending unit is deemed to be a 'low income' unit if its total income falls short of the cutoff level calculated in this manner. (A general discussion of the history and interpretation of low income cutoffs is available in the Appendix to the 1980 issue of Statistics Canada Catalogue No. 13-207.)

Table 3.14 shows by age of head the percentages of all families and unattached individuals and also of families with husband and wife present, whose incomes in 1983 fell below the cutoff level. For families in which the husband and wife are both present, the proportions are relatively low -- in the 7 to 13 percent range. Furthermore, there is no clear tendency for the proportion to increase with age. These proportions appear to be generally consistent with those presented in Table 3.4, based on male income tax returns.

It is obvious, however, that the proportion of all families falling into the husband-wife category declines with age, while the proportion widowed, in particular, rises. (In fact, by ages 70-74, less than half of all reporting units were husband-wife units.) The striking information from the first column of Table 3.14 is that the proportion of all families and unattached individuals below the low-income cut off level rises very sharply with the age of the head, reaching more than 44 percent of those whose head is 80 or over. A very large proportion of the 'old old', as they are sometimes referred to, thus appear to be in the low income category, based on 1983 data and the Statistics Canada definition.

F Further Comments and Qualifications

Our discussion of the income position of the elderly has concentrated attention on income before taxes. Yet the elderly have some age-related tax advantages -- most notably their higher level of personal exemptions and the property tax credit -- that are of undoubted advantage in terms of enhancing the purchasing power of a given level of income.

Serious concerns are sometimes raised about the quality of the data on which the age-income profiles are based, especially about the underreporting of both income and assets, and the possibility that it varies systematically with the age of the respondent. In the U.S. context Schulz (1985) refers to a study conducted by the Social Security Administration's Office of Research and Statistics that found very large errors in the income responses to the Current Population Survey income questions: 'in 1977 the CPS underestimated the mean income of all family and single units by 11 percent. However, the incomes of family units headed by persons age 65 or older showed an increase, when adjusted for underreporting, of 41 percent! The extent of CPS underestimating was much larger for those with higher incomes and relatively small for those at the low-income levels. The major cause of error in the income estimates was underreporting of property income (interest, dividends, rent, royalties, and trust income) and to a lesser extent self-employment income (especially farm income).' (p.20) He goes on to note that the '. . . same caution applies [to asset statistics] -- probably more so.' (p. 20)

The income reported for taxation purposes in Canada would perhaps be less likely to involve extensive underreporting of property and self-employment income, although of course the values reported will reflect adjustments for various tax incentives whose benefits tend generally to rise with income level.

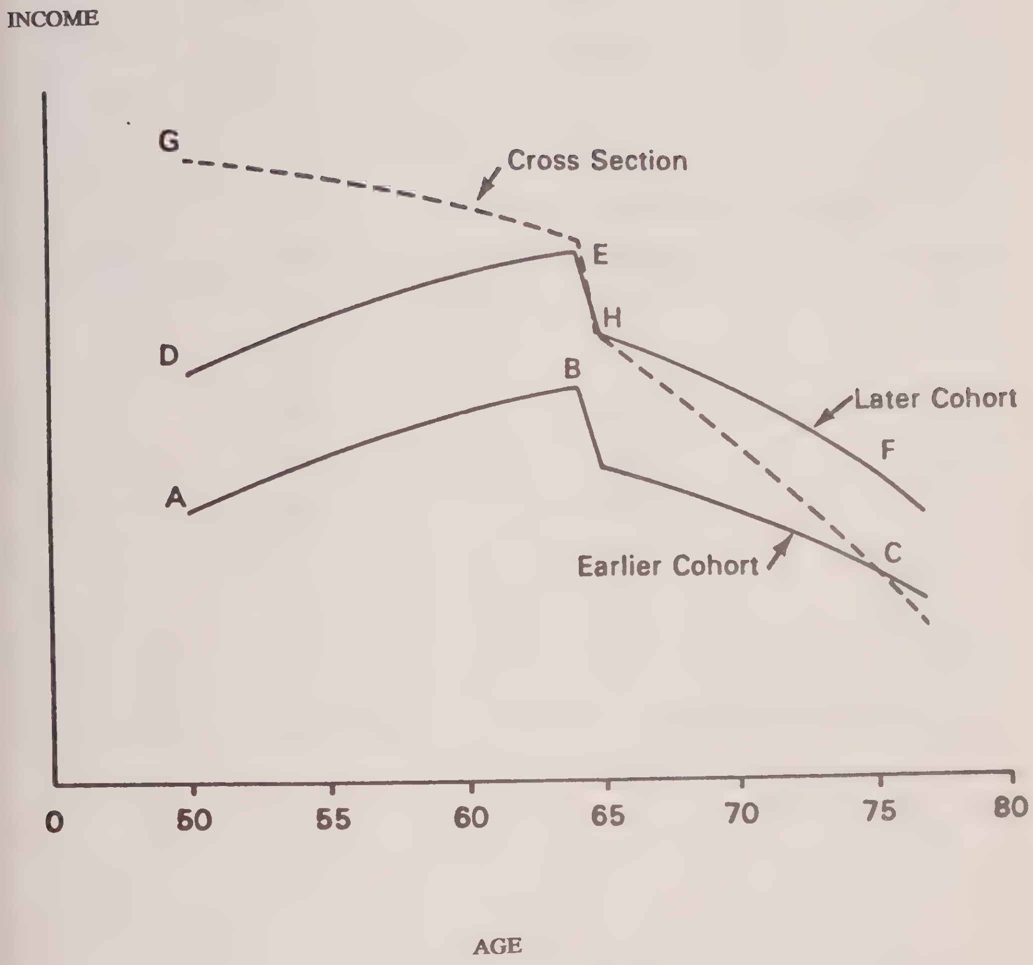
We also note that in the preceding discussion no allowance has been made for income in kind. Stone and MacLean (1979) suggested that 'the most important components of the non-money income of senior citizens in Canada are (1) the value of subsidization of health care costs; (2) the market value of personal care, and recreational and housing services made available by relatives and friends; and (3) the aggregate value of 'senior citizen discounts' . . . ' (p.24). They 'estimate that the 1976 aggregate income flow to persons aged 65 and over would be at least 30 percent above that estimated from the Survey of Consumer Finances if we were to take into account unreported money and non-money income sources.' (p.24) 'Furthermore, the 30 percent addition . . . may itself be a serious underestimate of the true state of affairs [since it] takes into account neither the market value of free personal care, recreational and housing services, nor the aggregate value of 'senior citizen price discounts' (p.25).

In the U.S. context Smeeding (1982) has estimated the 1980 market value of the major publicly provided food, housing and medical care benefits. 'Of the five transfer programs covered in this report, medical transfers constitute over 80 percent of the total market value of in-kind benefits.' (p.vi) 'In no subgroup of the population is the effect of the value of medical benefits greater than on the elderly. The official poverty rate for the elderly was 14.7 percent in 1979. Food and housing benefits at market value reduce this poverty rate to 12.9 percent. The addition of the value of medical benefits with institutional care included reduces the poverty rate for this group dramatically to 4.5 percent.' (p.vii)

There can be no doubt that in-kind income in the form of publicly provided medical care does result in individuals being better off than they would be otherwise -- and hence such expenditures could properly be counted as part of the 'income' of the recipient population. It should be emphasized, however, that merely to count free health care as income without taking account of the increase in health requirements with which it is associated may give quite a false impression of the well being of recipients. The increase in income associated with higher health care payments goes hand in hand with an increase in the needs of recipients. The problem, therefore, is how to value the benefits. Ideally, they would not be given a market valuation, but would instead be valued in accordance with their value to the recipients -- the amount that they would have been willing to pay. The market valuation places an upper bound on this figure.

FIGURE 3-1

ILLUSTRATIVE AGE-INCOME PROFILES
(CONSTANT DOLLARS)



SOURCE: Taken from Denton, Kliman, and Spencer (1981), p. 71.

TABLE 3.1

AVERAGE TOTAL INCOME OF ALL MALES FILING INCOME TAX RETURNS, BY AGE, 1964-84 (1984 DOLLARS)

Age	1964	1969	1974	1979	1984
45-49	21,081	24,671	32,185	33,364	31,962
50-54	20,315	23,693	30,776	32,510	31,301
55-59	19,595	22,137	28,545	30,450	29,602
60-64	18,143	20,225	24,993	26,965	26,165
65-69	15,656	16,071	19,075	20,826	22,236
70+	14,729	13,245	13,213	15,325	18,381
All ages	17,147	19,292	23,503	24,648	23,873

Note: The figures for 'all ages' include persons under 45.

SOURCE: Based on figures published in Revenue Canada, Taxation Statistics (Ottawa, various issues).

TABLE 3.2

AVERAGE TOTAL INCOME, BEFORE AND AFTER AGE 65, FOR ALL MALES FILING INCOME TAX RETURNS, 1963-84 (1984 DOLLARS)

Ages 60-64		Ages 65-69		Income at Ages 65-69 As % of Income at Ages 60-64
Year	Income	Year	Income	
1963	17,652	1968	15,569	88.2
1964	18,143	1969	16,071	88.6
1965	18,995	1970	16,194	85.3
1966	18,622	1971	16,162	86.8
1967	19,091	1972	17,131	89.7
1968	19,537	1973	17,869	91.5
1969	20,225	1974	19,075	94.3
1970	20,622	1975	19,413	94.1
1971	21,276	1976	19,636	92.3
1972	22,477	1977	19,784	88.0
1973	23,631	1978	20,034	84.8
1974	24,993	1979	20,826	83.3
1975	25,376	1980	22,471	88.6
1976	25,984	1981	22,649	87.2
1977	26,372	1982	22,212	84.2
1978	25,942	1983	21,297	82.1
1979	26,965	1984	22,236	82.5

SOURCE: Based on figures published in Revenue Canada, Taxation Statistics (various issues).

TABLE 3.3

AVERAGE TOTAL INCOME FOR ALL INDIVIDUALS FILING INCOME TAX RETURNS RETURNS, BY AGE, 1968-84 (1984 DOLLARS)

1968		1972		1976		1980		1984	
Age	Income	Age	Income	Age	Income	Age	Income	Age	Income
44	19,965	48	23,299	52	26,234	56	24,358	60	22,002
45	19,927	49	23,238	53	25,599	57	24,677	61	21,699
46	19,873	50	23,052	54	25,698	58	24,769	62	20,690
47	19,697	51	22,614	55	25,939	59	24,167	63	20,494
48	19,651	52	22,616	56	25,172	60	23,471	64	19,195
49	19,548	53	21,910	57	24,317	61	22,612	65	19,790
50	19,210	54	21,873	58	23,976	62	22,126	66	19,555
51	19,341	55	22,261	59	23,331	63	21,655	67	19,801
52	19,447	56	21,718	60	24,174	64	20,646	68	18,458
53	19,280	57	22,065	61	22,320	65	20,892	69	18,627
54	18,941	58	20,926	62	21,634	66	20,207	70	17,814
55	19,158	59	21,104	63	20,887	67	19,434		
56	18,754	60	20,443	64	20,169	68	18,220		
57	19,068	61	19,927	65	19,173	69	18,040		
58	18,245	62	19,148	66	17,231	70	17,373		
59	18,345	63	18,766	67	15,958				
60	17,967	64	18,415	68	15,558				
61	17,562	65	17,228	69	13,817				
62	17,603	66	15,553	70	13,789				
63	16,951	67	13,722						
64	16,756	68	13,384						
65	15,020	69	12,887						
66	14,103	70	12,639						
All	15,828		17,656		20,053		18,869		18,240

NOTE: Based on figures published in Revenue Canada, Taxation Statistics.

TABLE 3.4

MALES WHO FILED INCOME TAX RETURNS REPORTING TOTAL INCOME LESS THAN ONE-QUARTER OF THE OVERALL MALE AVERAGE, BY AGE, 1964-84 (PERCENTAGES)

Age	1964	1969	1974	1979	1984
45-49	5.4	6.9	4.2	5.0	7.1
50-54	6.7	7.7	5.3	6.0	7.8
55-59	8.0	9.4	7.1	8.3	9.5
60-64	10.8	11.6	10.0	10.7	11.9
65-69	12.4	15.0	16.9	14.1	8.4
70+	11.6	18.0	34.1	28.2	12.6

NOTE: The average income levels (in each year's current dollars) were $4,655 in 1964, $6,263 in 1969, $10,147 in 1974, $16,264 in 1979, and $23,873 in 1984.

SOURCE: Based on figures published in Revenue Canada, Taxation Statistics.

TABLE 3.5

MAJOR INCOME COMPONENTS FOR FAMILIES AND UNATTACHED INDIVIDUALS, BY AGE OF HEAD, CANADA, 1983 (AVERAGE DOLLAR VALUE PER UNIT)

	Earnings				Government Transfers				
Age of Head	Wages & Salaries	Self-Employ	Total	Invest-ment Income	OAS/GIS Benefits	CPP/QPP Benefits	Total	Retire-ment Pensions	Tota Incom
				All Families and Unattached Individuals					
50-54	30,516	2,213	32,729	2,084	152	160	2,428	313	37,91
55-59	24,297	2,246	26,543	2,893	136	323	2,371	922	33,08
60-64	18,092	1,796	19,888	3,325	375	588	3,068	2,384	29,19
65-69	6,260	863	7,123	3,562	4,384	2,238	7,598	2,671	21,41
70-74	2,989	557	3,546	3,799	5,437	2,273	8,346	1,907	17,77
75-79	1,606	437	2,043	3,535	5,726	1,530	7.743	1,875	15,38
80+	1,023	109	1,132	3,424	6,118	670	7,594	1,353	13,66
				Families with Head and Spouse Present					
50-54	35,597	2,822	38,419	2,443	139	91	2,244	271	43,63
55-59	29,616	2,795	32,411	3,042	132	194	2,229	804	38,82
60-64	22,385	2,377	24,762	3,732	427	430	2,977	2,860	34,86
65-69	8,746	1,210	9,956	4,232	4,875	2,623	8,575	3,249	26,56
70-74	3,959	953	4,912	5,055	6,418	2,892	10,061	2,685	22,94
75-79	2,326	640	2,966	4,272	7,317	2,007	9,880	2,735	20,15
80+	822	95	917	5,179	8,060	1,126	9,980	2,124	18,33

Note: Components may not sum to totals because of rounding and because not all components are shown.

SOURCE: Tabulations based on the Statistics Canada 1984 Survey of Consumer Finances public use sample tape.

ABLE 3.6

MAJOR INCOME COMPONENTS FOR FAMILIES AND UNATTACHED INDIVIDUALS, BY AGE OF HEAD, CANADA, 1983 (PERCENTAGE DISTRIBUTION)

	Earnings				Government Transfers				
Age of Head	Wages & Salaries	Self-Employ	Total	Investment Income	OAS/GIS Benefits	CPP/QPP Benefits	Total	Retirement Pensions	Total Income
				All Families and Unattached Individuals					
50-54	80.5	5.8	86.3	5.5	0.4	0.4	6.4	0.8	100.0
55-59	73.4	6.8	80.2	8.7	0.4	1.0	7.2	2.8	100.0
60-64	62.0	6.2	68.1	11.4	1.3	2.0	10.5	8.2	100.0
65-69	29.2	4.0	33.3	16.6	20.5	10.5	35.5	12.5	100.0
70-74	16.8	3.1	19.9	21.4	30.6	12.8	47.0	10.7	100.0
75-79	10.4	2.8	13.3	23.0	37.2	9.9	50.3	12.2	100.0
80+	7.5	0.8	8.3	25.1	44.8	4.9	55.6	9.9	100.0
				Families with Head and Spouse Present					
50-54	81.6	6.5	88.0	5.6	0.3	0.2	5.1	0.6	100.0
55-59	76.3	7.2	83.5	7.8	0.3	0.5	5.7	2.1	100.0
60-64	64.2	6.8	71.0	10.7	1.2	1.2	8.5	8.2	100.0
65-69	32.9	4.6	37.5	15.9	18.4	9.9	32.3	12.2	100.0
70-74	17.3	4.2	21.4	22.0	28.0	12.6	43.8	11.7	100.0
75-79	11.5	3.2	14.7	21.2	36.3	10.0	49.0	13.6	100.0
80+	4.5	0.5	5.0	28.3	44.0	6.1	54.4	11.6	100.0

Note: Components may not sum to totals because of rounding and because not all components are shown.

SOURCE: Tabulations based on the Statistics Canada 1984 Survey of Consumer Finances public use sample tape.

TABLE 3.7

MAJOR INCOME COMPONENTS FOR FAMILIES AND UNATTACHED INDIVIDUALS, BY AGE OF HEAD, CANADA, 1983 (AVERAGE DOLLAR VALUE PER PERSON)

Age of Head	Earnings: Wages & Salaries	Earnings: Self-Employ	Earnings: Total	Investment Income	Government Transfers: OAS/GIS Benefits	Government Transfers: CPP/QPP Benefits	Government Transfers: Total	Retirement Pensions	Tot Incom
				All Families and Unattached Individuals					
50-54	9,652	700	10,352	659	48	50	768	99	11,99
55-59	9,260	856	10,116	1,103	52	123	903	351	12,61
60-64	8,095	804	8,899	1,488	168	263	1,373	1,067	13,06
65-69	3,230	445	3,676	1,838	2,262	1,155	3,921	1,378	11,05
70-74	1,740	324	2,064	2,211	3,165	1,323	4,858	1,110	10,34
75-79	1,020	277	1,297	2,244	3,635	971	4,916	1,190	9,76
80+	666	71	737	2,231	3,986	436	4,948	882	8,90
				Families with Head and Spouse Present					
50-54	9,950	789	10,739	683	39	26	627	76	12,19
55-59	9,639	910	10,548	990	43	63	725	262	12,63
60-64	8,485	901	9,385	1,415	162	163	1,129	1,084	13,21
65-69	3,624	502	4,126	1,754	2,020	1,087	3,554	1,346	11,00
70-74	1,762	424	2,186	2,250	2,856	1,287	4,477	1,195	10,21
75-79	1,081	298	1,379	1,986	3,403	933	4,594	1,272	9,37
80+	392	45	438	2,471	3,846	537	4,762	1,014	8,74

Note: Components may not sum to totals because of rounding and because not all components are shown.

SOURCE: Tabulations based on the Statistics Canada 1984 Survey of Consumer Finances public use sampl tape.

ABLE 3.8

AJOR ASSET HOLDINGS FOR FAMILIES AND UNATTACHED INDIVIDUALS, BY AGE F HEAD, CANADA, 1984 (AVERAGE DOLLAR VALUE PER UNIT)

	Financial Assets								
	Liquid Assets			Other Financial Assets					
Age of Head	Deposits	CSBs	Total	Stocks	Total	Owner-Occupied Home	Other Real Estate	Business Equity	Total
All Families and Unattached Individuals									
50-54	11,622	3,478	15,686	2,480	29,554	57,619	12,233	26,649	133,668
55-59	13,433	3,222	18,033	4,031	32,500	56,245	14,805	25,053	135,065
60-64	17,784	5,242	24,694	3,870	40,528	53,788	13,615	19,654	133,900
65-69	18,321	4,974	23,740	2,749	36,027	41,476	7,856	18,130	107,978
70-74	19,952	6,057	27,595	3,553	36,389	39,386	8,451	9,099	96,776
75-79	18,187	6,269	25,286	2,893	30,090	34,047	3,640	3,506	74,008
80+	20,249	4,875	25,883	4,507	32,277	28,062	3,133	4,157	69,065
Families with Head and Spouse Present									
50-54	13,360	3,785	17,619	3,052	34,630	68,508	14,418	33,613	160,336
55-59	14,299	3,679	19,578	2,747	35,509	66,977	18,557	31,741	160,673
60-64	20,402	6,088	28,243	4,494	47,940	65,247	17,555	27,264	165,920
65-69	20,569	6,503	27,711	2,904	43,824	52,042	8,933	26,492	137,488
70-74	26,076	7,362	36,243	6,395	50,941	50,928	11,991	15,867	135,136
75-79	20,663	10,289	32,427	5,475	40,861	44,006	6,780	4,977	101,334
80+	26,067	7,192	34,138	10,586	47,254	37,586	6,137	10,029	103,992

OTE: Components may not sum to totals because of rounding and because not all components are shown.

OURCE: Tabulations based on the Statistics Canada 1984 Survey of Consumer Finances public use sample tape.

TABLE 3.9

MAJOR ASSET HOLDINGS FOR FAMILIES AND UNATTACHED INDIVIDUALS, BY AGE OF HEAD, CANADA, 1984 (PERCENTAGE DISTRIBUTIONS)

	Financial Assets								
	Liquid Assets			Other Financial Assets					
Age of Head	Deposits	CSBs	Total	Stocks	Total	Owner-Occupied Home	Other Real Estate	Business Equity	Total
				All Families and Unattached Individuals					
50-54	8.7	2.6	11.7	1.9	22.1	43.1	9.2	19.9	100.
55-59	9.9	2.4	13.4	3.0	24.1	41.6	11.0	18.5	100.
60-64	13.3	3.9	18.4	2.9	30.3	40.2	10.2	14.7	100.
65-69	17.0	4.6	22.0	2.5	33.4	38.4	7.3	16.8	100.
70-74	20.6	6.3	28.5	3.7	37.6	40.7	8.7	9.4	100.
75-79	24.6	8.5	34.2	3.9	40.7	46.0	4.9	4.7	100.
80+	29.3	7.1	37.5	6.5	46.7	40.6	4.5	6.0	100.
				Families with Head and Spouse Present					
50-54	8.3	2.4	11.0	1.9	21.6	42.7	9.0	21.0	100.
55-59	8.9	2.3	12.2	1.7	22.1	41.7	11.5	19.8	100.
60-64	12.3	3.7	17.0	2.7	28.9	39.3	10.6	16.4	100.
65-69	15.0	4.7	20.2	2.1	31.9	37.9	6.5	19.3	100.
70-74	19.3	5.4	26.8	4.7	37.7	37.7	8.8	11.7	100.
75-79	20.4	10.2	32.0	5.4	40.3	43.4	6.7	4.9	100.
80+	25.1	6.9	32.8	10.2	45.4	36.1	5.9	9.6	100.

NOTE: Components may not sum to totals because of rounding and because not all components are shown.

SOURCE: Tabulations based on the Statistics Canada 1984 Survey of Consumer Finances public use sampl tape.

TABLE 3.10

MAJOR ASSET HOLDINGS FOR FAMILIES AND UNATTACHED INDIVIDUALS, BY AGE OF HEAD, CANADA, 1984 (AVERAGE DOLLAR VALUE PER PERSON)

	Financial Assets								
	Liquid Assets			Other Financial Assets					
Age of Head	Deposits	CSBs	Total	Stocks	Total	Owner-Occupied Home	Other Real Estate	Business Equity	Total
				All Families and Unattached Individuals					
50-54	3,676	1,100	4,961	784	9,348	18,225	3,869	8,429	42,279
55-59	5,120	1,228	6,873	1,536	12,387	21,436	5,643	9,549	51,477
60-64	7,958	2,346	11,049	1,732	18,135	24,068	6,092	8,794	59,914
65-69	9,455	2,567	12,251	1,419	18,592	21,404	4,054	9,356	55,723
70-74	11,614	3,526	16,063	2,068	21,182	22,927	4,920	5,296	56,334
75-79	11,545	3,980	16,502	1,837	19,102	21,614	2,311	2,226	46,982
80+	13,193	3,176	16,864	2,937	21,030	18,284	2,041	2,708	44,998
				Families with Head and Spouse Present					
50-54	3,734	1,058	4,925	853	9,680	19,149	4,030	9,395	44,816
55-59	4,654	1,197	6,372	894	11,557	21,798	6,040	10,330	52,292
60-64	7,733	2,308	10,705	1,703	18,170	24,730	6,654	10,334	62,887
65-69	8,524	2,695	11,484	1,203	18,162	21,568	3,702	10,979	56,979
70-74	11,605	3,276	16,130	2,846	22,670	22,665	5,287	7,061	60,140
75-79	9,608	4,784	15,078	2,546	19,000	20,462	3,153	2,314	47,119
80+	12,437	3,432	16,288	5,051	22,546	17,933	2,928	4,785	49,617

NOTE: Components may not sum to totals because of rounding and because not all components are shown.

SOURCE: Tabulations based on the Statistics Canada 1984 Survey of Consumer Finances public use sample tape.

TABLE 3.11

NET WORTH AND MAJOR COMPONENTS OF DEBT FOR FAMILIES AND UNATTACHED INDIVIDUALS, BY AGE OF HEAD, CANADA, 1984 (AVERAGE DOLLAR VALUE PER UNIT)

Age of Head	Personal Debt		Mortgage on Owner-Occupied Home	Total Debt	Net Worth
	Consumer Debt	Total			
			All Families and Unattached Individuals		
50-54	3.152	4,115	7,162	11,278	122,390
55-59	2,624	3,472	5,158	8,360	126,434
60-64	1,745	2,762	2,758	5,520	128,380
65-69	690	961	1,326	2,287	105,691
70-74	379	634	1,094	1,727	95,049
75-79	223	333	147	479	73,529
80+	168	195	154	349	68,715
			Families with Head and Spouse Present		
50-54	3,812	4,688	8,627	13,315	147,021
55-59	3,308	4,392	6,370	10,762	149,910
60-64	2,165	3,006	3,421	6,427	159,493
65-69	874	1,264	1,434	2,698	134,791
70-74	526	790	1,502	2,291	132,844
75-79	219	298	322	620	100,714
80+	200	231	145	376	103,616

NOTE: Components may not sum to totals because of rounding and because not all components are shown.

SOURCE: Tabulations based on the Statistics Canada 1984 Survey of Consumer Finances public use sample tape.

TABLE 3.12

NET WORTH AND MAJOR COMPONENTS OF DEBT FOR FAMILIES AND UNATTACHED INDIVIDUALS, BY AGE OF HEAD, CANADA, 1984 (PERCENTAGE DISTRIBUTIONS)

Age of Head	Personal Debt: Consumer Debt	Personal Debt: Total	Mortgage on Owner-Occupied Home	Total Debt	Net Worth
			All Families and Unattached Individuals		
50-54	2.6	3.4	5.9	9.2	100.0
55-59	2.1	2.7	4.1	6.8	100.0
60-64	1.4	2.2	2.1	4.3	100.0
65-69	0.7	0.9	1.3	2.2	100.0
70-74	0.4	0.7	1.2	1.8	100.0
75-79	0.3	0.5	0.2	0.7	100.0
80+	0.2	0.3	0.2	0.5	100.0
			Families with Head and Spouse Present		
50-54	2.6	3.2	5.9	9.1	100.0
55-59	2.2	2.9	4.2	7.2	100.0
60-64	1.4	1.9	2.1	4.0	100.0
65-69	0.6	0.9	1.1	2.0	100.0
70-74	0.4	0.6	1.1	1.7	100.0
75-79	0.2	0.3	0.3	0.6	100.0
80+	0.2	0.2	0.1	0.4	100.0

NOTE: Components may not sum to totals because of rounding and because not all components are shown.

SOURCE: Tabulations based on the Statistics Canada 1984 Survey of Consumer Finances public use sample tape.

TABLE 3.13

NET WORTH AND MAJOR COMPONENTS OF DEBT FOR FAMILIES AND UNATTACHED INDIVIDUALS, BY AGE OF HEAD, CANADA, 1984 (AVERAGE DOLLAR VALUE PER PERSON)

Age of Head	Personal Debt: Consumer Debt	Personal Debt: Total	Mortgage on Owner-Occupied Home	Total Debt	Net Worth
		All Families and Unattached Individuals			
50-54	997	1,302	2,265	3,567	38,712
55-59	1,000	1,323	1,966	3,289	48,188
60-64	781	1,236	1,234	2,470	57,444
65-69	356	496	684	1,180	54,542
70-74	221	369	637	1,005	55,329
75-79	142	211	93	304	46,678
80+	110	127	100	228	44,771
		Families with Head and Spouse Present			
50-54	1,066	1,310	2,411	3,722	41,095
55-59	1,077	1,429	2,073	3,503	48,789
60-64	821	1,139	1,296	2,436	60,451
65-69	362	524	594	1,118	55,861
70-74	234	352	668	1,020	59,120
75-79	102	139	150	288	46,831
80+	95	110	69	179	49,438

NOTE: Components may not sum to totals because of rounding and because not all components are shown.

SOURCE: Tabulations based on the Statistics Canada 1984 Survey of Consumer Finances public use sample tape.

TABLE 3.14

PERCENTAGES OF FAMILIES AND UNATTACHED INDIVIDUALS BELOW THE 1978 LOW-INCOME CUTOFF, BY AGE OF HEAD, CANADA, 1983

Age of Head	All Families and Unattached Individuals	Families with Head and Spouse Present
50-54	13.0	7.0
55-59	17.3	8.8
60-64	20.2	12.4
65-69	24.8	11.9
70-74	30.2	10.1
75-79	35.4	9.2
80+	44.3	12.9

SOURCE: Tabulations based on the Statistics Canada 1984 Survey of Consumer Finances public use sample tape.

IV AGE AND EXPENDITURE PATTERNS

The previous section showed how average income levels and levels of asset holdings vary with age. We have noted that, on average, income levels fall, at least after retirement from full-time work. We now turn to the relationships between age and consumer expenditure. Do older people adjust their spending more-or-less in proportion to their incomes as their incomes fall? Alternatively, do they maintain their expenditure levels by saving less or (as the economist's life cycle theory of consumption suggests) by using up their capital? Whatever impact income reductions may have on the over all expenditure level, what effect does advancing age, as such, have on expenditure at a given level of income? Furthermore, what happens to the distribution of expenditure as people age, other things constant? Are there observable changes in expenditure patterns as people age, even if they remain financially able to maintain total expenditure levels? These are the major questions that we consider now.

A Age and Consumption Expenditures

It is sometimes suggested that people might be expected to spend less as they age, simply because their 'needs' change. In fact, the idea of needs is not very well defined for individuals living well above bare subsistence, and economists are, by and large, not very comfortable with the concept, preferring instead to interpret expenditure levels and patterns as reflections of observable preferences, taking into account prices, income and asset levels, and other household characteristics. At the same time, the concept of needs is very deeply embedded in most people's thinking. For present purposes we interpret the idea that needs decline with age to suggest roughly that individuals' preferred consumption levels would decline, on average, as they age, even if their financial means did not.

One might argue, for example, that expenditures on a number of work-related items of clothing, transportation, and food would simply disappear after retirement. Furthermore, with more time available retired people might be able to do more 'home production' than would otherwise be possible. While the value of time spent in this way can be considerable, it is not counted as part of measured income. Perhaps also housing and food requirements would be reduced, since typically there would be fewer dependents living in the household. Furthermore, many discounts that enhance purchasing power are available only to seniors. And so on. On the other side, of course, one could argue that while work- and household-size-related expenditures obviously diminish, expenditures on recreation and non-business travel might be expected to increase (at least for the healthy elderly) because of the greater availability of uncommitted time. Put differently, older members of society might be expected to find alternative ways of 'spending their money' as their personal circumstances change, just as one would expect younger people to modify their expenditure patterns as they pass through earlier stages of the life cycle. This line of argument would suggest, then, that the reason expenditure levels fall with age is largely (perhaps exclusively) because older people typically have less to spend, and not because 'needs' have changed.

This is a complex issue, and we can approach it here only in a rather tentative way. We start by considering the most recent information relating to age patterns of consumption, as derived from the Statistics Canada Survey of Family Expenditures. Table 4.1 shows all-Canada estimates of overall average consumption expenditure in 1982, and also expenditures in a number of categories. Figures are shown for selected age groups, as well as for all ages combined. Once again, age is measured by the age of the head, in this case the head of the spending unit.[1]

It can be seen from Table 4.1 that average consumption expenditure generally rises with age from ages 25-29 through 45-49, and then declines for each subsequent older age group. This age decline in average expenditure resembles the age decline in average income discussed in the previous section. It therefore appears that the age-profile of average consumption expenditure is closer to the age-profile of income than the life-cycle theory of consumption would anticipate. Indeed, it appears that spending units, on average, and over the entire span of ages shown, spend less than their current incomes on current consumption expenditures. Thus, on average, even people 75 and over apparently continue to accumulate assets rather than use them for current consumption purposes.

The percentage distribution of consumption across expenditure categories is shown in Table 4.2. The two largest categories are food and housing; together they account for about 57 per cent of total expenditure for all ages combined. The fraction of the budget spent on food rises with age from less than one-fifth for the youngest group shown to almost one-quarter for the oldest; however, most of the increase occurs by age 60 or so. Looking at the components of food, purchases from stores rise with age while purchases from restaurants fall. The age-related differences appear especially large before age 60 or so, but the patterns continue into the older years. The fraction spent on housing falls with age up to ages 55-59 and then increases sharply for the older age groups. (Housing includes expenditure on shelter, household operation, and household furnishings and equipment.) For spending units whose heads are 70-74, more than 63 per cent of total expenditures is accounted for by food and housing, while for those 75 and over the proportion exceeds 70 per cent.

The proportionate increases in food and housing must, of course, be offset by proportionate decreases elsewhere. We observe that the fractions of total expenditures on clothing, transportation, recreation, reading and education, and tobacco and alcohol decline with age, at least for the older age groups. We observe also the rather small increase in the proportionate allocation to health and personal care. While health care requirements undoubtedly increase with age, the major age-related ones involve increased physician care, purchases of prescription drugs, and hospitalization, most of which do not appear as part of consumer expenditure. (The bulk of them are covered by health insurance.)

Tables 4.3 and 4.4 provide similar information, but for Ontario. It can be seen that overall expenditure levels are somewhat higher for most age groups (on average, they are about 2.8 per cent higher), but that the Ontario proportionate distribution of expenditures resembles very closely the all-Canada distribution within each age group.

B A Further Analysis of Age-Consumption Patterns

In order to focus attention specifically on the age-pattern of total consumption expenditures and its distribution across expenditure categories, we would like to be able to abstract from any age-related changes in income, family size, and other spending unit characteristics that might affect expenditure levels and distribution, and concentrate on the impact of age alone. Yet we know that in the tables just considered average spending unit size varies with the age of head, and this clouds the interpretation of the age effects on expenditure levels and distribution. Moreover, size is not all that varies with age. The age distribution of members of the average spending unit changes; asset holdings (including homeownership) vary; the regional and urban/rural distribution varies; and so on.

With the use of statistical regression techniques it is possible in principle to estimate the impact that various such factors have, and to isolate the effects of age alone. Unfortunately, such estimates are never perfect; it is never possible to take into account everything one might think important. In this particular instance, we are limited to working with the Statistics Canada Family Expenditure Survey (FAMEX), since it is the only source that provides detailed consumer expenditure information. With the use of the 1982 FAMEX data we are able to take into account a number of the spending unit characteristics mentioned above, and others as well. Perhaps the major omission relates to the unit's holdings of assets: there are no direct measures of asset holdings in the FAMEX data set, aside from the value of owner-occupied housing. We are, therefore, not able to take full account of the impact that asset holdings might have on expenditure levels and patterns.

In general terms, we proceed as follows. Using information at the level of spending units, we estimate the relationship between total consumption expenditure on the one hand and a number of 'explanatory' variables on the other. The explanatory variables include region of residence, rural or urban size characteristic of the area in which the spending unit lives, sex and education of the head, and spending unit income. In addition, the age of the head is included among the explanatory variables, and we are especially interested here in the age patterns of expenditure after taking the other factors into account.

In other words, we use the estimation procedure to 'hold constant' other factors, and thereby allow an analysis of the effects of age alone.

Having estimated the relationship for total consumption expenditure, we proceed to estimate the relationship between that total and each of its components, again taking account statistically of the other factors mentioned. We are then in a position to focus attention on the effects of age on consumption, both in total and for each consumption expenditure category.

Equations were estimated separately for one-person spending units and two-person (husband-wife) units. In both cases, the estimation was restricted to those units in which the head was age 55 or more and reported income was at least zero. (The FAMEX data set includes some units that reported negative net income.) All equations were estimated by the method of 'ordinary' least squares. The estimated relationships are provided in an appendix to this section.

Table 4.5 displays the implied total consumption expenditure levels for one-person and two-person (husband-wife) households, based on the procedure just described. The expenditure values shown hold income constant at its average level;[2] also they assume that the spending unit occupies a mortgage-free house in an Ontario urban area larger than 100,000 population, and that the head is male and has less than grade 9 education. (These assumed characteristics of the spending unit and its head are the 'typical' characteristics observed in the sample; they could be varied without affecting the pattern of age effects on expenditure, which is of primary interest here.)

The results suggest that total expenditure does decrease somewhat with age, even when income is held constant. (Other characteristics are held constant also.) However, the estimated age differences are generally rather small, except for the oldest age group. We note further that, except for the oldest group, the expenditure level for each age group separately does not differ significantly (in a statistical sense) from the expenditure level for 65-69-year-old spending units.

The relatively low expenditure level estimated for the oldest age group warrants further consideration. The oldest age group includes all spending units headed by individuals who were 75 and over at the time of the survey. Thus it is representative of a much larger range of ages than the others, and no doubt includes much greater heterogeneity in terms of the characteristics of the spending units. In particular, health status is likely to be considerably more variables for this age group than for younger groups, and this could explain at least part of the estimated difference in average expenditure level. (We emphasize again that most health-related expenditures would not be included in those reported in the FAMEX Survey.) Unfortunately, health status is a factor that we are not able to take into account. Age-related differences in other factors that we are unable to take account of might also be important. Again, however, we have no way of controlling statistically for this possibility.[3]

We turn now to consider the allocation of the implied expenditure totals across the main expenditure categories, once again holding income constant. The estimated allocations are shown in Table 4.6 for one-person spending units and in Table 4.7 for two-person husband-wife units. As compared to Table 4.2, there are some quite striking differences. For example, these spending units are estimated to spend substantially larger fractions of their budgets on food and clothing, and a smaller fraction on housing. The relatively large fractions for food and clothing are likely explained by the low average income levels of the older units as compared to the population at large, while the smaller fraction for housing may result from their smaller average size.

However that may be, the most important observation for present purposes is that the estimated budget shares are generally much more similar across age groups after controlling for the effects of spending unit size, income level, education of head, and so on, than before such adjustments. Put differently, the effects of age alone appear to be much less pronounced than might have been thought if one were to judge on the basis of Table 4.2 alone. For example, while the estimated budget fraction going to housing does increase with age, whether one considers the one-person or the two-person spending units, the difference between the fraction for those with heads 55-59 and those with heads 75 and over is 8.3 percentage points after adjustment in the case of the one-person units, and 5.8 in the case of the husband-wife units. These differences compare with a difference of 13.8 percentage points without the adjustment.

These findings are necessarily tentative. Further work with data sets not currently available may improve the quality of the estimates, perhaps by taking into account factors that we were unable to consider. However, at this time it appears that there is evidence of some reduction in consumption expenditure associated specifically with age, at least among those in the age group 75 and over, after taking account of such other characteristics as are possible. Furthermore, it appears that the allocation of expenditure across major expenditure categories also varies systematically with age, though less than one might have thought prior to making adjustments for other factors. We note again that we have not been able to make any allowance for the effects of health status, which is undoubtedly more variable for the oldest age group than for others. In addition, we have been able to take account of wealth only in a limited and indirect way, through the inclusion in the analysis of investment income and a homeownership variable.[4]

TABLE 4.1

AVERAGE CONSUMPTION EXPENDITURES BY AGE OF HEAD AND EXPENDITURE CATEGORY, ONTARIO 1982 (DOLLARS)

Category	All Ages	25-29	35-39	45-49	55-59	60-64	65-69	70-74	75+
Food	4,218	3,673	4,969	5,648	4,515	3,718	3,132	2,739	2,289
Purchased from stores	3,207	2,496	3,773	4,385	3,590	3,048	2,589	2,298	1,993
Purchased from restaurants	995	1,164	1,188	1,253	915	660	526	429	248
Housing	7,160	7,444	9,111	8,331	6,247	5,432	4,917	4,534	4,192
Clothing	1,738	1,585	2,095	2,564	1,719	1,315	976	726	698
Transportation	3,241	3,151	3,679	4,278	3,678	3,061	2,162	1,889	984
Health and Personal Care	855	752	983	1,210	904	719	650	544	474
Recreation Reading and Education	1,672	1,679	2,045	2,436	1,617	1,043	880	663	456
Tobacco and Alcohol	932	1,041	998	1,164	1,066	756	594	364	234
Total Expenditure	19,817	19,326	23,879	25,633	19,746	16,044	13,311	11,459	9,226

SOURCE: Special tabulation by the authors, based on the 1982 Survey of Family Expenditure public use sample tape supplied by Statistics Canada.

TABLE 4.2

DISTRIBUTION OF CONSUMPTION EXPENDITURES BY AGE OF HEAD AND EXPENDITURE CATEGORY, ONTARIO 1982 (PERCENTAGES)

Category	All Ages	25-29	35-39	45-49	55-59	60-64	65-69	70-74	75+
Food	21.3	19.0	20.8	22.0	22.9	23.2	23.5	23.9	24.8
Purchased from stores	16.2	12.9	15.8	17.1	18.2	19.0	19.4	20.1	21.6
Purchased from restaurants	5.0	6.0	5.0	4.9	4.6	4.1	4.0	3.7	2.7
Housing	36.1	38.5	38.2	32.5	31.6	33.9	36.9	39.6	45.4
Clothing	8.8	8.2	8.8	10.0	8.7	8.2	7.3	6.3	6.5
Transportation	16.4	16.3	15.4	16.7	18.6	19.1	16.2	16.5	10.7
Health and Personal Care	4.3	3.9	4.1	4.7	4.6	4.5	4.9	4.7	5.1
Recreation Reading and Education	8.4	8.7	8.6	9.5	8.2	6.5	6.6	5.8	4.9
Tobacco and Alcohol	4.7	5.4	4.2	4.5	5.4	4.7	4.5	3.2	2.5
Total Expenditure	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: Components may not sum exactly to totals because of rounding error.

Source: Based on Table 4.1.

TABLE 4.3

AVERAGE CONSUMPTION EXPENDITURES BY AGE OF HEAD AND EXPENDITURE CATEGORY, ONTARIO 1982 (DOLLARS)

Category	All Ages	25-29	35-39	45-49	55-59	60-64	65-69	70-74	75+
Food	4,344	3,752	4,870	5,883	4,499	3,866	3,245	2,772	2,306
Purchased from stores	3,251	2,405	3,631	4,508	3,567	3,140	2,626	2,310	2,049
Purchased from restaurants	1,082	1,339	1,238	1,370	923	723	597	462	257
Housing	7,420	7,605	9,495	8,596	6,043	5,749	4,882	4,782	4,560
Clothing	1,754	1,691	2,019	2,602	1,639	1,330	889	662	639
Transportation	3,285	3,265	3,479	4,411	3,715	3,209	2,079	2,037	1,032
Health and Personal Care	872	786	1,051	1,252	873	749	630	475	474
Recreation Reading and Education	1,702	1,755	1,881	2,573	1,614	1,069	910	677	427
Tobacco and Alcohol	990	1,033	1,050	1,200	1,253	801	733	387	255
Total Expenditure	20,367	19,888	23,845	26,518	19,636	16,773	13,309	11,792	9,693

SOURCE: See Table 4.1.

TABLE 4.4

DISTRIBUTION OF CONSUMPTION EXPENDITURES BY AGE OF HEAD AND EXPENDITURE CATEGORY, ONTARIO 1982 (PERCENTAGES)

Category	All Ages	25-29	35-39	45-49	55-59	60-64	65-69	70-74	75+
Food	21.3	18.9	20.4	22.2	22.9	23.0	24.4	23.5	23.8
Purchased from stores	16.0	12.1	15.2	17.0	18.2	18.7	19.7	19.6	21.1
Purchased from restaurants	5.3	6.7	5.2	5.2	4.7	4.3	4.5	3.9	2.7
Housing	36.4	38.2	39.8	32.4	30.8	34.3	36.2	40.6	47.0
Clothing	8.6	8.5	8.5	9.8	8.3	7.9	6.7	5.6	6.6
Transportation	16.1	16.4	14.6	16.6	18.9	19.1	15.6	17.3	10.6
Health and Personal Care	4.3	4.0	4.4	4.7	4.4	4.5	4.7	4.0	4.9
Recreation Reading and Education	8.4	8.8	7.9	9.7	8.2	6.4	6.8	5.7	4.4
Tobacco and Alcohol	4.9	5.2	4.4	4.5	6.4	4.8	5.5	3.3	2.6
Total Expenditure	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

NOTE: Components may not sum exactly to totals because of rounding error.

SOURCE: Based on Table 4.3.

TABLE 4.5

ESTIMATED AGE-CONSUMPTION EXPENDITURE LEVELS FOR OLDER ONE- AND TWO-PERSON SPENDING UNITS (DOLLARS)

Spending Unit Size	Age of Head				
	55-59	60-64	65-69	70-74	75+
1 Person	8,411	8,246	8,273	7,802	7,396
2 Persons	12,467	12,229	12,493	12,064	10,444

NOTE: The estimated expenditure levels are based on regression analysis of data from the 1982 Survey of Family Expenses as described in the text. The expenditure levels are based on the assumption that age alone changes. Specifically the one-person spending units are males with less than grade 9 education living in a mortgage-free house in an Ontario urban area larger than 100,000 and having an income of $11,200; the two-person units include only husband and wife, with total income of $23,000 and otherwise with the same characteristics as one-person units.

TABLE 4.6

ESTIMATED ALLOCATION OF CONSUMPTION EXPENDITURE FOR OLDER ONE-PERSON SPENDING UNITS (PERCENTAGES)

Expenditure Category	Age of Head				
	55-59	60-64	65-69	70-74	75+
Food	28.2	28.2	29.0	29.9	29.7
Purchased from stores	22.7	22.9	23.8	24.8	24.9
Purchased from restaurants	5.0	5.1	5.2	5.1	4.1
Housing	33.3	35.5	36.8	39.5	41.6
Clothing	4.6	3.8	4.2	3.3	3.0
Transportation	14.9	15.4	14.1	12.2	11.4
Health and Personal Care	3.9	3.8	3.0	3.2	3.7
Recreation, Reading and Education	5.3	4.0	4.6	4.5	3.7
Tobacco and Alcohol	9.9	9.3	8.3	7.4	6.9
Total	100.0	100.0	100.0	100.0	100.0

NOTE: The estimated expenditure proportions are based on regression analysis of data from the 1982 Survey of Family Expenditures, as described in the text. The proportions are based on the assumption that age alone changes; other characteristics are described in the text and in the note to Table 4.5.

TABLE 4.7

ESTIMATED ALLOCATION OF CONSUMPTION EXPENDITURE FOR OLDER TWO-PERSON SPENDING UNITS (PERCENTAGES)

Expenditure Category	Age of Head				
	55-59	60-64	65-69	70-74	75+
Food	28.2	28.4	27.0	27.7	29.8
Purchased from stores	24.7	25.4	24.4	24.9	27.5
Purchased from restaurants	3.5	3.0	2.6	2.8	2.3
Housing	33.8	32.6	35.1	35.7	39.6
Clothing	6.2	6.3	6.1	5.6	5.5
Transportation	15.5	16.3	16.0	16.7	11.9
Health and Personal Care	5.8	5.8	5.4	5.6	5.7
Recreation, Reading and Education	3.8	4.2	4.6	4.2	3.7
Tobacco and Alcohol	6.8	6.3	5.7	4.3	3.9
Total	100.0	100.0	100.0	100.0	100.0

NOTE: The estimated expenditure proportions are based on regression analysis of data from the 1982 Survey of Family Expenditures, as described in the text. The proportions are based on the assumption that age alone changes; other characteristics are described in the text and in the note to Table 4.5.

V AGE AND THE IMPACT OF INFLATION

It is clear from the preceding discussion that both total expenditure and its distribution across expenditure categories vary with the age of the spending unit. The question arises, therefore, as to whether the impact of inflation might differ among age groups. This is an important matter, inasmuch as it bears on the appropriateness of the overall consumer price index for indexing pensions received by pensions of different ages. In this section we make further use of the Statistics Canada 1982 Family Expenditure Survey to ask whether historically the overall CPI has provided a reasonable measure of inflation for the elderly population.

The consumer price index, as prepared and published by Statistics Canada, is designed to provide a measure of price change over time for a representative 'basket' of consumer commodities and services purchased by Canadian households. More specifically, the index is based on the expenditure patterns of families and unattached individuals living in private households in urban centres with populations of 30,000 or more. The current basket reflects the expenditure patterns of 1982, and is itself derived largely from the 1982 Family Expenditure Survey.

In the first column of Table 5.1 we show, at a fairly high level of aggregation, the weights used in the official Statistics Canada CPI calculation. (In practice, the calculations reflect price changes at a much more detailed level.) We show also a set of FAMEX proportions for each of a number of selected age groups, as derived from the 1982 Survey. As before, 'age' is the age of the spending unit head. In practice, we have worked with individual household records from the Survey at the most disaggregated commodity classification that could be matched with the CPI categories, and then aggregated to the CPI expenditure categories shown in the table. In addition, we have followed the Statistics Canada practice of imputing a value for the services derived from homeownership, and including this as part of the 'housing' weight.[1] (It is primarily because of this imputation that the FAMEX proportions in Table 5.1 differ from the expenditure distribution shown in Table 4.2.)

The FAMEX expenditure proportions for all age groups combined, and for each of a number of selected age groups separately, may be compared with the official CPI weights in Table 5.1 for all Canada, and in Table 5.2 for Ontario alone. First, it may be observed that for all ages combined, the FAMEX proportions differ very little from the CPI weights, whether the comparison is for Canada or for Ontario. This is to be expected since, as already noted, the CPI weights themselves are based very largely on 1982 FAMEX data.

It is with respect to the various age groups taken separately that there are some clearly discernible differences. As noted earlier, the food expenditure proportion rises steadily with age: those 75 and over spend an additional 5 per cent of their budget on food, as compared to those 25-29. Also, the housing expenditure proportion is relatively high for young families, relatively low for those with heads in their 40s, 50s, and early 60s, and then rises sharply for those in their late 60s, and more especially, those in their 70s and over. On average, families and unattached individuals in the oldest group spend an additional 14 per cent of their budget on housing, as compared to those 55-59. Similar comments apply in the case of the FAMEX proportions based on Ontario data. Differences of such magnitudes in the expenditure patterns might imply that the overall CPI would not be an appropriate index to use for a particular age group.

We have calculated age-specific consumer price indexes for a number of age groups in order to learn whether the overall CPI would in fact have provided a reasonably accurate measure of the impact of inflation on the older population. The calculation assumes that the age-specific expenditure patterns derived from the 1982 FAMEX data were constant over time, and compares across age groups the changes in the cost of purchasing the 1982 basket for the period 1971-86.

The results are summarized in Tables 5.3 and 5.4. Table 5.3 is based on Canada expenditure weights and Table 5.4 on Ontario weights. In all cases, the indexes are defined relative to a 1981 value of 100.0. Clearly the official CPI measure of inflation differs very little from the one based on the FAMEX expenditure weights for all ages combined, whether considered at the Canada or the Ontario level. One would not expect exact agreement, since the expenditure weights have, in fact, changed over time in the official CPI calculations, to reflect observed changes in expenditure patterns, whereas our calculations based on the FAMEX weights assume no change. Also, our calculations, of necessity, reflect less detailed price change information than is taken into account in the official CPI calculations. Nonetheless, the differences between our calculated indexes and the official CPI are reassuringly small for purposes of the present comparisons.

Consider now the age-specific indexes. A quick inspection of the tables suggests that the differences from one age group to another are very small. We conclude from this that the overall Canadian CPI would have provided as adequate a measure of the impact of inflation on the older population as on any other age group.

The fact that the measure would have been satisfactory historically does not, of course, provide complete confidence that it will be equally so in the future. However, there has been a considerable range of inflation experience over the historical period in question, ranging from a low of 2.9 per cent in 1971 to a high of 12.5 per cent in 1981. If, in the future, the overall measure of inflation indicated by the CPI goes outside this range its appropriateness for the older age groups might be reassessed. Furthermore, it would be possible to keep track of developments in a related measure of inflation now prepared routinely by Statistics Canada, namely the CPI for Low-Income Senior Citizens. The CPI measure of inflation calculated specifically for this group has moved in a manner very similar to the overall CPI over the period for which it has been calculated, as has the CPI for all low-income recipients also constructed by Statistics Canada. Should the Low-Income Senior Citizens index move in a divergent fashion in the future, a reassessment of the appropriateness of the overall CPI for pension indexing would be in order.

TABLE 5.1

COMPARISON OF EXPENDITURE WEIGHTS USED IN THE CALCULATION OF THE CPI AND EXPENDITURE PROPORTIONS OF SELECTED AGE GROUPS, CANADA, 1982 (PERCENTAGES)

		FAMEX Proportions								
Expenditure Category	CPI Weights	All Ages	25-29	35-39	45-49	55-59	60-64	65-69	70-74	7
Food	20.0	20.6	18.7	20.1	21.3	22.0	22.1	22.4	22.8	2
Housing	38.1	38.1	39.5	40.2	34.8	34.2	36.8	39.9	42.4	4
Clothing	8.4	8.5	8.1	8.5	9.7	8.4	7.8	7.0	6.0	
Transportation	15.8	15.9	16.0	14.9	16.1	17.9	18.2	15.5	15.7	1
Health and Personal Care	4.0	4.2	3.8	4.0	4.6	4.4	4.3	4.7	4.5	
Recreation, Reading and Education	8.3	8.2	8.5	8.3	9.2	7.9	6.2	6.3	5.5	
Tobacco and Alcohol	5.5	4.6	5.3	4.0	4.4	5.2	4.5	4.3	3.0	
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	10

Note: Age refers to age of household head. The expenditure proportions for the categories show derived from detailed expenditure tables; the expenditures at a detailed level were classified i cordance with the CPI groups before being aggregated and expressed as proportions. The compo may not sum exactly to 100.0 because of rounding error.

SOURCE: The CPI weights are from Statistics Canada, The Consumer Price Index Reference Paper Cat. N 553 (Ottawa, 1985), pp. 123-46. The 1982 FAMEX proportions are based on the public use s tape; they refer to all families and unattached individuals resident in urban areas of 30,000 or at the time of the survey; the housing component includes an imputation analogous to that ma the construction of the CPI for the service flow derived from the use of owner-occupied homes.

TABLE 5.2

COMPARISON OF EXPENDITURE WEIGHTS USED IN THE CALCULATION OF THE CPI AND EXPENDITURE PROPORTIONS OF SELECTED AGE GROUPS, ONTARIO, 1982 (PERCENTAGES)

		FAMEX Proportions								
Expenditure Category	CPI Weights	All Ages	25-29	35-39	45-49	55-59	60-64	65-69	70-74	75+
Food	20.0	20.6	18.6	19.7	21.4	22.0	21.9	23.2	22.4	22.0
Housing	38.1	38.6	39.2	41.8	34.9	33.7	37.4	39.4	43.5	49.8
Clothing	8.4	8.3	8.4	8.2	9.5	8.0	7.5	6.3	5.3	6.2
Transportation	15.8	15.6	16.2	14.1	16.0	18.1	18.2	14.8	16.4	10.1
Health and Personal Care	4.0	4.1	3.9	4.3	4.5	4.3	4.2	4.5	3.8	4.0
Recreation, Reading and Education	8.3	8.1	8.7	7.6	9.3	7.9	6.1	6.5	5.5	4.2
Tobacco and Alcohol	5.5	4.7	5.1	4.3	4.4	6.1	4.5	5.2	3.1	2.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: Age refers to age of household head. The expenditure proportions for the categories shown derived from detailed expenditure tables; the expenditures at a detailed level were classified in cordance with the CPI groups before being aggregated and expressed as proportions. The compon may not sum exactly to 100.0 because of rounding error.

Source: The CPI weights are from Statistics Canada, The Consumer Price Index Reference Paper Cat. No. 553 (Ottawa, 1985), pp. 123-46. The 1982 FAMEX proportions are based on the public use san tape; they refer to all families and unattached individuals resident in urban areas of 30,000 or m at the time of the survey; the housing component includes an imputation analogous to that mad the construction of the CPI for the service flow derived from the use of owner-occupied homes.

TABLE 5.3

AGE-SPECIFIC CONSUMER PRICE INDEXES, 1971-1986, ASSUMING 1982 CANADA EXPENDITURE WEIGHTS (1981=100.0)

Year	Official CPI	Indexes based on FAMEX expenditure weights								
		All Ages	25-29	35-39	45-49	55-59	60-64	65-69	70-74	75+
1971	42.2	45.0	46.7	44.5	44.3	44.0	43.9	44.2	44.6	45.7
1972	44.2	46.8	48.5	46.5	46.2	45.8	45.8	46.1	46.4	47.6
1973	47.6	49.7	51.2	49.4	49.2	48.8	48.7	49.1	49.4	50.5
1974	52.8	54.6	55.8	54.3	54.2	53.7	53.6	53.9	54.1	55.1
1975	58.5	60.0	61.1	59.7	59.6	59.2	59.0	59.2	59.4	60.2
1976	62.9	64.7	65.8	64.5	64.3	63.8	63.7	63.9	64.1	64.8
1977	67.9	69.6	70.7	69.6	69.2	68.8	68.7	69.0	69.2	70.0
1978	73.9	75.0	75.8	75.0	74.6	74.3	74.3	74.6	74.9	75.8
1979	80.7	81.5	82.1	81.5	81.2	80.9	80.9	81.2	81.4	82.2
1980	88.9	89.3	89.7	89.3	89.2	89.0	88.9	89.1	89.1	89.7
1981	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1982	110.8	110.7	110.6	110.8	110.6	110.8	110.9	110.8	110.8	110.5
1983	117.2	117.3	117.4	117.4	117.1	117.4	117.4	117.5	117.4	117.1
1984	122.3	122.3	122.4	122.2	122.0	122.5	122.5	122.6	122.5	122.3
1985	127.2	126.9	127.1	126.7	126.6	127.2	127.1	127.2	127.0	126.7
1986	132.4	131.8	132.2	131.5	131.5	132.1	131.9	132.0	131.6	131.4

TABLE 5.4

AGE-SPECIFIC CONSUMER PRICE INDEXES, 1971-1986, ASSUMING 1982 CANADA EXPENDITURE WEIGHTS (1981=100.0)

		Indexes based on FAMEX expenditure weights								
Year	Official CPI	All Ages	25-29	35-39	45-49	55-59	60-64	65-69	70-74	75+
1971	42.2	45.0	47.1	44.6	44.5	43.9	43.9	44.2	44.6	45.6
1972	44.2	46.8	48.8	46.6	46.3	45.7	45.7	46.1	46.5	47.5
1973	47.6	49.7	51.5	49.5	49.3	48.7	48.7	49.1	49.4	50.4
1974	52.8	54.6	56.1	54.3	54.3	53.6	53.6	53.9	54.1	54.9
1975	58.5	60.0	61.4	59.8	59.7	59.1	59.0	59.3	59.4	60.0
1976	62.9	64.7	66.1	64.6	64.3	63.7	63.6	64.0	64.1	64.7
1977	67.9	69.6	70.9	69.7	69.3	68.7	68.7	69.0	69.2	70.0
1978	73.9	75.0	75.9	75.1	74.7	74.2	74.3	74.7	74.9	75.8
1979	80.7	81.5	82.2	81.5	81.3	80.8	80.9	81.3	81.4	82.2
1980	88.9	89.3	89.8	89.3	89.2	88.9	88.9	89.1	89.1	89.6
1981	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1982	110.8	110.7	110.5	110.9	110.5	110.9	110.9	110.9	110.9	110.6
1983	117.2	117.3	117.3	117.5	117.1	117.5	117.4	117.5	117.4	117.3
1984	122.3	122.3	122.3	122.3	122.0	122.6	122.4	122.7	122.5	122.4
1985	127.2	126.9	127.0	126.8	126.6	127.5	127.0	127.3	127.1	126.8
1986	132.4	131.8	132.0	131.6	131.5	132.5	131.7	132.3	131.6	131.4

VI ALTERNATIVE INDEXING STANDARDS

We step back from the foregoing detailed calculations and note that there are several available or potentially available statistical series that could, in principle, serve as indexing standards if a price-based or wage-based indexing formula were to be chosen. We comment below on these series.

A The All-Canada Consumer Price Index

This is of course the best known price index, and the one most commonly used for indexing in pension plans (ones for which indexing is already in effect), wage contracts, insurance contracts, and so on. It is prepared and published monthly by Statistics Canada and is available a few weeks after the end of the month to which it applies. It covers most commodities and services purchased by consumers but there are some exceptions. (The most notable exception for present purposes is in the health care category; both health insurance premiums and direct payments by patients to physicians and hospitals are excluded.) The all-Canada CPI applies to private households in urban centres of 30,000 population or more, plus those living in Whitehorse and Yellowknife. (The latter are included in order to give the Yukon and Northwest Territories some representation in the index.) The CPI is formally a fixed-weight index but the weights are revised from time to time, based on more recent expenditure data.

Ontario represents about 37 per cent of the Canadian population and it is reasonable to ask therefore whether an all-Canada index properly represents what is happening to prices within the province. It is reasonable to ask also whether an index calculated for all households properly reflects price effects among the elderly population. In practice, it has long been observed that prices in different parts of the country tend to move in much the same way -- at the least, that they reflect major changes in the general consumer price level. (This is not to say that price levels are the same everywhere, merely that the changes in price levels are similar.) Based on the results presented in the previous section, it is also evident that price effects on consumer budgets are about the same, whatever the age group of the consumers, and whether or not they live in Ontario. (At least this has been so in the 1970s and 1980s.)

There thus appears to be a strong case for using the all-Canada CPI if a price-based indexing formula is selected, even though it is not compiled specifically for the elderly population of Ontario. The arguments are (1) that it is a widely accepted measure of the general consumer price level and widely used in other indexing contexts, (2) that it is available on a timely basis, (3) that it is not subject to troublesome revisions, as other series may be, and (4) that it appears to reflect quite accurately price changes in different parts of the country and for different components of the population.

B The National Accounts Price Index for Personal Expenditure on Goods and Services

This all-Canada index is a product of the price-deflation of the national accounts. It is referred to as an ‘implicit’ price index because it is not calculated directly, but rather emerges as the ratio of aggregate current-dollar consumer expenditure to aggregate constant-dollar expenditure. Price indexes for particular categories of consumer expenditure are applied directly to deflate the current-dollar values in those categories and the overall index calculated at the end of the process is an implicitly weighted combination of the category indexes. The majority of the category indexes come from CPI sources. However, the implicit weights in the National Accounts index differ from the CPI weights, and in fact are variable from quarter to quarter and year to year (as they should be, given the purpose for which the calculations are carried out). The one advantage of the National Accounts index is that it is somewhat more broadly based than the CPI. However, it is not, to our knowledge, used for indexing purposes, and it is subject to revision. In short, while it may have theoretical advantages over the CPI it has some practical disadvantages and we would not recommend its adoption as an indexing standard.

C Price Indexes for Ontario Cities

There is no regularly compiled version of the CPI for Ontario as a whole but there are indexes for three Ontario cities, namely, Toronto, Ottawa, and Thunder Bay. These indexes are prepared by Statistics Canada on the same basis as the national CPI, but using city weights and city price data. They are published monthly. One can conceive of the Toronto index being chosen as a standard, or perhaps a weighted combination of the indexes for all three cities. However, given the general similarity of price movements across the country it is not clear that this option would have much to recommend it over the use of the generally accepted 'official' (all-Canada) CPI.

D The Statistics Canada CPI for Low-Income Senior Citizens

As noted in Section V, Statistics Canada has calculated and published a price index specifically for the population 65 years of age and older who satisfy a low-income definition. The index is again an urban index for Canada as a whole. The weights on which the low-income senior citizen index are based are rather different from those of the overall CPI but the movements of the two indexes are generally similar. If an indexing standard is required that applies at average income levels, not just at low levels, the overall CPI again seems to us to be the best choice.

E Specially Constructed Price Indexes for the Older Population of Ontario

It would be possible to do, on a regular basis, what we have done in the previous section, namely to calculate a special index for the elderly population as a group, or even different special indexes for different age components of the elderly population. This could be done using all-Canada data. Alternatively, it could be done using only Ontario data, or possibly Ontario expenditure weights coupled with national price data. The calculations could be done by Statistics Canada, under contract, perhaps, or by an agency of the Ontario Government using Statistics Canada data. Once again, though, the movements of the overall national consumer price index seem to be so representative of price movements generally, for different areas and different population groups, that we think it would be hard to make a case against the use of the widely accepted 'official' CPI.

F Average Weekly Earnings

If a wage-related rather than a price-related indexing formula were to be chosen, the most obvious source of an indexing standard would be the Statistics Canada monthly Survey of Employment, Earnings, and Hours. This survey provides series of average weekly earnings covering most of the industrial spectrum. Separate figures are published for individual industries and composite figures referred to as 'industrial aggregates' are published also. Separate figures are provided for all employees, and for employees paid by the hour. Figures with and without overtime earnings are provided.

The average weekly earnings series are available for Ontario, as well as for other provinces and for Canada as a whole. A decision about exactly which series to use would have to be made but the series are available on a relatively timely basis and any one of them could readily be incorporated into an indexing formula. We assume that the choice would be one of the Ontario industrial aggregate weekly earnings series. In practice, the percentage movements of the different weekly earnings series are likely to be very similar, just as the movements of different price indexes are quite similar.

G Average Hourly Earnings

The Statistics Canada Survey of Employment, Earnings, and Hours also provides series of average hourly earnings on the same general basis as the weekly earnings series. The hourly and weekly series may show some variations in movement, but their general trends are unlikely to differ greatly. Certainly both types of series will reflect both general wage inflation and general productivity increases. Again we would suppose that the natural choice of an average hourly earnings series would be an 'industrial aggregate', as Statistics Canada terms it. The hourly earnings series are available for Ontario.

VII INFLATION PROTECTION FORMULAS

The three categories of inflation protection formulas that are of main interest are ones based (a) on price indexing, (b) on wage indexing, and (c) on 'excess' pension fund earnings. We discuss each of these categories and specify the particular formulas within each that are incorporated into the simulation experiments reported in the next section. More technical specifications of the formulas are provided in an appendix, available from the author on request.

A Price Indexing Formulas

We consider under this heading formulas that tie pension adjustments to the CPI. A formula may provide full or partial indexing for any increase in the CPI; alternatively, indexing may be in effect only when the annual CPI increase is greater than some minimum level or less than some maximum.

The advantage of price indexing is, of course, that it maintains (fully or partially) the purchasing power of a pension relative to its initial level, at the time of retirement. It does not maintain a pensioner's position relative to the society's standard of living: if the general standard of living rises as a result of technological advances pensioners do not share in the gains, even with full price indexing. The benchmark is the pensioner's own standard at retirement, not the current standard in the society at large.

The choice of a particular formula bears on the extent of uncertainty about future purchasing power losses. In general, fractional indexing with no minimum level implies greater uncertainty than full indexing with a minimum. For example, if there is a minimum of 1 per cent per annum with full indexing above that level, a pensioner can be almost certain that he will be subject to a decline of about $9^1/_2$ per cent over ten years and 18 per cent over twenty.

If, on the other hand, there is no minimum, but only a fraction of the inflation rate is offset each year, the actual loss of purchasing power will depend on the time path of price change over the one or two decades, and will therefore be less predictable.[1]

Any number of variants of the basic price-indexing scheme can be specified. The ones that we chose for the initial simulation experiments are the following; for convenience of reference, they are coded P1 to P7:

P1: 100 per cent CPI protection above 0 per cent per annum
P2: 80 per cent CPI protection above 0 per cent per annum
P3: 60 per cent CPI protection above 0 per cent per annum
P4: 100 per cent CPI protection above 1 per cent per annum
P5: 100 per cent CPI protection above 2 per cent per annum
P6: 100 per cent CPI protection above 3 per cent per annum
P7: 80 per cent CPI protection above 2 per cent per annum

B Wage Indexing Formulas

Under the heading 'wage indexing' we include formulas that involve adjustment to pension levels based on changes in average weekly or average hourly earnings, rather than changes in prices. The formulas are the same as the price indexing formulas, except that an earnings index replaces the CPI. As before, there may or may not be a minimum level.

Broadly speaking, wage indexing has the virtue (from the pensioner's point of view) of maintaining (partially or in full) the *relative* purchasing power of a pension -- relative to the standard of living of the society, that is. As before, the choice of formula determines the degree of uncertainty facing a pensioner.

The formulas that we chose initially in this case take average weekly earnings as the indexing standard. They are coded W1 to W7 and correspond exactly to the seven price-indexing formulas, with WI ('wage indexing') replacing CPI:

W1: 100 per cent WI protection above 0 per cent per annum
W2: 80 per cent WI protection above 0 per cent per annum
W3: 60 per cent WI protection above 0 per cent per annum
W4: 100 per cent WI protection above 1 per cent per annum
W5: 100 per cent WI protection above 2 per cent per annum
W6: 100 per cent WI protection above 3 per cent per annum
W7: 80 per cent WI protection above 2 per cent per annum

C Excess Earnings Formulas

Formulas based on the 'excess' earnings of a pension fund have an important feature not present in price indexing and wage indexing formulas -- namely that the benefits to a pensioner will vary, depending on the performance of the fund from which the pension is paid. Funds that do relatively well may generate large benefits; funds that do relatively poorly may generate small ones. This feature introduces an additional and possibly very large element of uncertainty into the pensioner's situation: the pension purchasing power stream is now subject not only to the general uncertainty associated with the time path of the economy; it is subject also to the uncertainty associated with the performance of the particular pension fund. To the elderly individual, gains or losses of purchasing power are much more of a dice game than if they were tied to broadly based indexing standards.

Under an excess earnings formula, if the earnings rate exceeds some specified level (e.g., 7 per cent) the 'excess' accrues to the benefit of present and future pensioners. Exactly how such a formula would work in practice depends on its detailed specification. We therefore need to make some assumptions in order to define the formulas used in the simulation analysis. The assumptions that we make are the following:

(1) there is a specified rate which we refer to as the 'trigger rate'; the formula comes into effect when a fund's rate of return exceeds the trigger rate;

(2) excess earnings are allocated to the augmentation of current annual pension payments in the proportion that such payments bear to the total value of the fund, after allowance for a contingency reserve;
(3) the rate of return to a fund is a function of (a) the general level of interest rates in the economy, (b) the fund's long-run propensity to do better or worse than other pension funds, and (c) random elements that influence the fund's performance in the short run;
(4) the relative performance of a fund in a given year is correlated, to some extent, with its performance in the previous year, in addition to being subject to random influences.

The definition of an excess earnings formula and the foregoing assumptions are stated more precisely in the appendix, available from the authors.

The excess earnings formulas that we have chosen to explore by simulation are coded X1 to X7. Their specifications are as follows:

X1: Baseline formula -- trigger rate of 7 per cent; fund's average rate of return about 2 per cent above the 3-month treasury bill rate in the long run; contingency reserve 6 per cent of total fund value
X2: 'Low' trigger rate -- trigger rate of 5 per cent; otherwise the same as X1
X3: 'High' trigger rate -- trigger rate of 9 per cent; otherwise the same as X1
X4: 'Low' fund rate of return -- average rate of return just equal to the 3-month treasury bill rate in the long run; otherwise the same as X1
X5: 'High' fund rate of return -- average rate of return about 4 per cent above the 3-month treasury bill rate in the long run; otherwise the same as X1
X6: 'Low' contingency reserve -- contingency reserve 2 per cent of total fund value; otherwise the same as X1
X7: 'High' contingency reserve -- contingency reserve 10 per cent of total fund value; otherwise the same as X1

D Additional Formulas

After the initial set of experiments were carried out, based on the formulas specified above, a number of other experiments were designed. These incorporated price indexing and wage indexing formulas in which a maximum was placed on the adjustments for inflation. The price-indexing formulas specified for the second round of experiments are as follows:

P8: 100 per cent CPI protection above 0 per cent per annum, to a maximum of 5 per cent per annum (i.e., CPI increases greater than 5 per cent treated as if they were 5 per cent)

P9: 90 per cent CPI protection above 0 per cent per annum, to a maximum of 6 per cent per annum (i.e., CPI increases greater than 6 per cent treated as if they were 6 per cent; maximum adjustment is therefore 5.4 per cent)

P10: 80 per cent CPI protection above 0 per cent per annum, to a maximum of 6 per cent per annum (maximum adjustment 4.8 per cent)

P11: 60 per cent CPI protection above 0 per cent per annum, to a maximum of 6 per cent per annum (maximum adjustment 3.6 per cent)

P12: 80 per cent CPI protection above 0 per cent per annum, to a maximum of 9 per cent per annum (maximum adjustment 7.2 per cent)

P13: 60 per cent CPI protection above 0 per cent per annum, to a maximum of 9 per cent per annum (maximum adjustment 5.4 per cent)

P14: 100 per cent CPI protection above 2 per cent per annum to a maximum of 9 per cent per annum (maximum adjustment 7 per cent)

The wage indexing formulas used in the second round correspond to the price indexing formulas, with CPI replaced by WI:

W8: 100 per cent WI protection above 0 per cent per annum, to a maximum of 5 per cent per annum (i.e., WI increases greater than 5 per cent treated as if they were 5 per cent)

W9: 90 per cent WI protection above 0 per cent per annum, to a maximum of 6 per cent per annum (i.e., WI increases greater than 6 per cent treated as if they were 6 per cent; maximum adjustment is therefore 5.4 per cent)

W10: 80 per cent WI protection above 0 per cent per annum, to a maximum of 6 per cent per annum (maximum adjustment 4.8 per cent)

W11: 60 per cent WI protection above 0 per cent per annum, to a maximum of 6 per cent per annum (maximum adjustment 3.6 per cent)

W12: 80 per cent WI protection above 0 per cent per annum, to a maximum of 9 per cent per annum (maximum adjustment 7.2 per cent)

W13: 60 per cent WI protection above 0 per cent per annum, to a maximum of 9 per cent per annum (maximum adjustment 5.4 per cent)

W14: 100 per cent WI protection above 2 per cent per annum, to a maximum of 9 per cent per annum (maximum adjustment 7 per cent)

VIII SIMULATED EFFECTS OF ALTERNATIVE FORMULAS ON THE REAL VALUE OF A PENSION

No one can make a trustworthy prediction of the future course of inflation. It is difficult enough to anticipate changes a few months ahead, let alone one or two decades. For this reason it is not possible to determine accurately the effect that any given protection formula will have on the real value (purchasing power) of a pension. What one can do, however, is to use the historical record of inflation rates as a basis for making probability statements -- statements about the probabilities that the loss of real value will be greater than 10 per cent, 20 per cent, or 50 per cent, say, if a particular formula is adopted. We have calculated probabilities of this kind and present them in this section. We also present estimated average purchasing power losses and measures of the uncertainty attaching to the losses, as represented by calculated standard deviations. The calculations are based on a large number of computer simulation experiments. The design of the experiments is described in general terms below, and in more technical terms in the appendix, available from the authors.

The basic idea is that the rates of price and wage inflation, together with interest rates, are determined jointly in every year by a process that depends partly on past rates and partly on purely random events. The process is represented by what is referred to in the statistical literature as a multivariate autoregressive model. The model has been estimated using annual data for the period 1947 to 1986. In a computer simulation experiment the model is first used to generate one particular future time path of inflation and interest rates, random effects being incorporated each year in a manner consistent with the model. In this way an initial year-by-year projection is made for the next 25 years. (1986 is the last year for which actual annual data are available and is taken to be the starting point for the projection.) The experiment is then repeated, with a different drawing of random values to represent the random effects in the model, and a different future time path is thereby generated. In total, the experiment is repeated 10,000 times, thus generating 10,000 possible futures. For each year in each repetition of the experiment, the various inflation protection formulas defined in Section VII are applied. At the end of the 10,000 experiments we then have a frequency distribution of purchasing power losses under each formula. The frequency distributions allow us to calculate averages (mean values), standard deviations, and various probabilities.

The results of the experiments are summarized in Tables 8.1 to 8.5. Tables 8.1 and 8.2 present results for price indexing formulas, Tables 8.3 and 8.4 for wage indexing formulas, and Table 8.5 for excess earnings formulas. The formulas are identified in the tables by summary descriptions and by the P, W, and X codes. Results with no protection (NP) are reported also in each table, for comparison with the others.

Means, standard deviations, and probabilities of purchasing power losses are recorded in the tables for intervals of 5, 10, 15, 20, and 25 years after retirement. 'Purchasing power losses' are defined in two ways: (1) in absolute terms -- in relation to the purchasing power of a pension at the time of retirement, that is; and (2) in relative terms -- relative to the level of average weekly earnings in a given year.

A Experimental Results for Price Indexing Formulas

The results in the first panel of Table 8.1 show the effects of inflation on the purchasing power of a pension that has no protection. The mean absolute loss is 45.5 per cent after ten years, for example, and 71.7 per cent after twenty. In other words, a person retiring at age 65, say, would have a pension worth less than 30 per cent of its original real value by the age of 85. The average relative losses are even greater, inasmuch as average weekly earnings tend to rise faster than prices, reflecting expected long-run gains in real wages. (The long-run or trend rate of increase of wages is about 8/10 of 1 per cent per year greater than the long-run rate of price increase in the experiments.) The standard deviations reflect the variations of the results for different experiments around the means for all experiments combined.

The probabilities for the NP case are interpreted as follows. After 5 years, it is a virtual certainty (probability .999) that there will have been some loss of purchasing power; the probability is .978 that this loss will exceed 10 per cent and .751 that it will exceed 20 per cent. After 15 years, it is almost certain (probability .994) that the absolute loss will be greater than 35 per cent. The probabilities are, of course, higher when losses are reckoned in absolute terms.

Full protection against any CPI increase (formula P1) ensures that absolute purchasing power cannot decline, and indeed there is a small probability that it will increase slightly, inasmuch as there is a small probability of a decrease in the CPI once in a while in a very large number of future scenarios. (Note that increases in purchasing power are represented by negative numbers in the mean per centage loss columns.) However, the increases are negligible; essentially, formula P1 keeps the absolute level of purchasing power where it was at the time of retirement. At the same time, it allows relative purchasing power to decline, with high probability. The mean loss of relative purchasing power is 7.4 per cent after ten years and 13.5 per cent after twenty, for example.

Formulas P2 and P3 compensate pensioners for 80 per cent and 60 per cent of annual CPI increases, rather than 100 per cent. The mean losses and loss probabilities are correspondingly higher. With 80 per cent protection, relative purchasing power is reduced by 21.9 per cent after twenty years; with 60 per cent protection it is reduced by 39.3 per cent. Moreover, the degree of uncertainty about future losses varies inversely with the amount of protection, as evidenced by the increases in standard deviations in moving from P1 to P2 to P3.

Formulas P4, P5, and P6 give full CPI protection above minimum levels of 1 per cent, 2 per cent, and 3 per cent increases per annum, respectively. The mean losses and probabilities reflect the reductions of protection. Formula P6 yields roughly the same mean losses as formula P3, it may be noted. However, the standard deviations are considerably lower, reflecting the fact that formulas with a 100 per cent protection above a minimum level generally have less uncertainty associated with them than formulas that provide fractional protection against all CPI increases. This is a point that we have emphasized earlier in the present report, and one that Professor Pesando has also emphasized in his report to the Task Force.

Formula P7 involves 80 per cent CPI protection against increases greater than 2 per cent per year. It yields mean losses roughly the same as those of formulas P3 and P6 and standard deviations that lie between those of P3 and P6.

The additional price indexing experiments reported in Table 8.2 involve ceilings on the rate of inflation for which protection is provided. A general characteristic of the formulas in these experiments is that they imply larger mean losses and greater uncertainty than comparable formulas with no ceiling. Raising the ceiling from 6 per cent to 9 per cent in the experiments reduces the mean losses substantially, and reduces also the extent of uncertainty.

B Experimental Results for Wage Indexing Formulas

The wage indexing results in Tables 8.3 and 8.4 display patterns similar to those of the price indexing results, although for any given formula wage indexing provides, on average, a greater degree of inflation protection than does price indexing. Full protection, as with formula Wl, produces some gains in mean absolute purchasing power, and of course holds relative purchasing power approximately constant. All of the other formulas result in mean losses in absolute as well as relative terms. Fractional protection and minimum levels of increase before protection is initiated have the same implications for uncertainty as they did in the corresponding price indexing formulas, as evidenced again by comparisons of standard deviations. Imposing ceilings on the rate of wage inflation when compensation is provided creates larger mean losses and greater uncertainty, relative to results based on comparable formulas with no ceiling.

C Experimental Results for Excess Earnings Formulas

The results based on excess earnings formulas, as shown in Table 8.5, display some interesting new features. First, they are seen to be highly sensitive to the specification of both the trigger rate and the long-run performance of the pension fund. With the baseline formula that we have chosen, there are average purchasing power losses, although they are much lower than those when there is no protection. The trigger rate is 7 per cent in the baseline case (X1); when it is decreased to 5 per cent (X2), the losses are converted to substantial absolute gains; when it is increased to 9 per cent (X3), the losses return, and at much higher levels. Similarly, moving from a fund that has a long-run rate of return that is 2 per cent above the 3-month treasury bill rate (X1) to one that has a long-run rate of return just equal to the treasury bill rate (X4) causes a very large increase in average losses; moving in the other direction, to a fund with a long-run rate of return that is 4 per cent above the treasury bill rate (X5) results in considerable average gains. Altering the contingency reserve ratio has some effect also, but the effect is much less than that induced by the other changes.

A second feature of interest is that the standard deviations in Table 8.5 are far higher than those in Tables 8.1 to 8.4. Clearly, excess earnings formulas induce the greatest level of uncertainty about future pension purchasing power. Some excess earnings formulas induce more uncertainty than others, but in all cases the level is high. From the pensioner's point of view, excess earnings formulas represent the biggest gamble of the three classes of formulas investigated. This is reflected in the probabilities shown in the tables, as well as the standard deviations. Generally speaking, the excess earnings probabilities are less concentrated than the price indexing and wage indexing probabilities; one could have only a modest loss, or even a gain, with high probability, but there is also a substantial probability of a very large loss.

TABLE 8.1

ABSOLUTE AND RELATIVE PERCENTAGE LOSSES OF PENSION PURCHASING POWER WITH ALTERNATIVE PRICE INDEXING FORMULAS: MEANS, STANDARD DEVIATIONS, AND PROBABILITIES (INITIAL EXPERIMENTS)

		Absolute Losses							Relative Losses						
Formula	Years Since Retirement	Mean %	Std Dev %	Probability of loss in excess of --					Mean %	Std Dev %	Probability of loss in excess of --				
				0%	10%	20%	35%	50%			0%	10%	20%	35%	50%
NP: No inflation protection	5	24.4	6.8	0.999	0.978	0.751	0.049	0.000	27.6	6.4	1.000	0.994	0.882	0.118	0.000
	10	45.5	8.8	1.000	0.999	0.994	0.876	0.324	49.6	8.4	1.000	1.000	0.998	0.949	0.518
	15	60.8	8.5	1.000	1.000	1.000	0.994	0.892	65.0	7.9	1.000	1.000	1.000	0.998	0.954
	20	71.7	7.4	1.000	1.000	1.000	1.000	0.990	75.6	6.7	1.000	1.000	1.000	1.000	0.998
	25	79.6	6.1	1.000	1.000	1.000	1.000	1.000	83.0	5.4	1.000	1.000	1.000	1.000	1.000
P1: 100% CPI protection	5	-0.1	0.4	0.000	0.000	0.000	0.000	0.000	4.1	4.0	0.845	0.065	0.000	0.000	0.000
	10	-0.2	0.7	0.000	0.000	0.000	0.000	0.000	7.4	5.6	0.904	0.328	0.007	0.000	0.000
	15	-0.2	0.9	0.000	0.000	0.000	0.000	0.000	10.4	6.7	0.934	0.548	0.069	0.000	0.000
	20	-0.3	1.1	0.000	0.000	0.000	0.000	0.000	13.5	7.4	0.959	0.698	0.192	0.001	0.000
	25	-0.4	1.2	0.000	0.000	0.000	0.000	0.000	16.4	8.0	0.972	0.794	0.338	0.004	0.000
P2: 80% CPI protection	5	5.3	1.8	0.991	0.001	0.000	0.000	0.000	9.2	3.7	0.989	0.426	0.001	0.000	0.000
	10	11.2	2.9	0.997	0.678	0.001	0.000	0.000	17.8	5.4	0.997	0.920	0.353	0.000	0.000
	15	16.7	3.7	0.999	0.957	0.180	0.000	0.000	25.6	6.3	0.999	0.988	0.822	0.057	0.000
	20	21.9	4.1	1.000	0.992	0.706	0.000	0.000	32.7	6.7	1.000	0.998	0.960	0.387	0.001
	25	26.8	4.4	1.000	0.999	0.930	0.021	0.000	39.0	6.9	1.000	1.000	0.992	0.742	0.042
P3: 60% CPI protection	5	10.4	3.2	0.997	0.578	0.000	0.000	0.000	14.2	4.1	0.999	0.852	0.068	0.000	0.000
	10	21.3	5.0	1.000	0.981	0.619	0.001	0.000	27.2	6.1	1.000	0.995	0.879	0.090	0.000
	15	30.9	5.9	1.000	0.998	0.958	0.251	0.000	38.3	6.8	1.000	0.999	0.992	0.707	0.029
	20	39.3	6.2	1.000	1.000	0.996	0.768	0.029	47.7	6.9	1.000	1.000	0.999	0.954	0.393
	25	46.7	6.2	1.000	1.000	1.000	0.960	0.313	55.6	6.7	1.000	1.000	1.000	0.994	0.811
P4: 100% CPI protection above 1%	5	4.4	0.7	0.995	0.000	0.000	0.000	0.000	8.4	3.9	0.982	0.349	0.001	0.000	0.000
	10	8.6	1.1	0.998	0.000	0.000	0.000	0.000	15.5	5.2	0.996	0.857	0.190	0.000	0.000
	15	12.7	1.3	0.999	0.957	0.000	0.000	0.000	22.0	5.9	0.999	0.975	0.642	0.008	0.000
	20	16.5	1.5	1.000	0.990	0.000	0.000	0.000	28.0	6.2	1.000	0.996	0.900	0.121	0.000
	25	20.2	1.6	1.000	0.998	0.771	0.000	0.000	33.5	6.4	1.000	0.999	0.974	0.433	0.002
P5: 100% CPI protection above 2%	5	8.7	1.1	0.998	0.000	0.000	0.000	0.000	12.4	3.7	0.998	0.750	0.016	0.000	0.000
	10	16.5	1.6	1.000	0.988	0.000	0.000	0.000	22.8	4.8	1.000	0.993	0.728	0.003	0.000
	15	23.7	1.8	1.000	0.999	0.951	0.000	0.000	31.8	5.2	1.000	0.999	0.983	0.282	0.000
	20	30.3	1.9	1.000	1.000	0.995	0.000	0.000	39.9	5.3	1.000	1.000	0.999	0.826	0.018
	25	36.3	2.0	1.000	1.000	1.000	0.836	0.000	46.9	5.3	1.000	1.000	1.000	0.977	0.292
P6: 100% CPI protection above 3%	5	12.5	1.7	0.999	0.924	0.000	0.000	0.000	16.1	3.6	1.000	0.951	0.138	0.000	0.000
	10	23.4	2.2	1.000	0.997	0.926	0.000	0.000	29.1	4.6	1.000	0.999	0.966	0.093	0.000
	15	32.9	2.5	1.000	1.000	0.996	0.013	0.000	40.1	4.9	1.000	1.000	0.999	0.856	0.010
	20	41.3	2.5	1.000	1.000	1.000	0.967	0.000	49.4	4.8	1.000	1.000	1.000	0.993	0.485
	25	48.6	2.5	1.000	1.000	1.000	0.998	0.365	57.2	4.5	1.000	1.000	1.000	1.000	0.938
P7: 80% CPI protection above 2%	5	12.0	2.1	0.998	0.873	0.000	0.000	0.000	15.7	3.6	1.000	0.938	0.110	0.000	0.000
	10	23.3	3.1	1.000	0.996	0.878	0.000	0.000	29.1	4.9	1.000	0.998	0.959	0.104	0.000
	15	33.2	3.6	1.000	1.000	0.994	0.329	0.000	40.3	5.3	1.000	1.000	0.998	0.849	0.020
	20	41.8	3.7	1.000	1.000	1.000	0.948	0.002	49.8	5.3	1.000	1.000	1.000	0.989	0.525
	25	49.3	3.7	1.000	1.000	1.000	0.996	0.479	57.8	5.1	1.000	1.000	1.000	1.000	0.928

TABLE 8.2

ABSOLUTE AND RELATIVE PERCENTAGE LOSSES OF PENSION PURCHASING POWER WITH ALTERNATIVE PRICE INDEXING FORMULAS: MEANS, STANDARD DEVIATIONS, AND PROBABILITIES (ADDITIONAL EXPERIMENTS)

		Absolute Losses							Relative Losses						
				Probability of loss in excess of --							Probability of loss in excess of --				
Formula	Years Since Retire- ment	Mean %	Std Dev %	0%	10%	20%	35%	50%	Mean %	Std Dev %	0%	10%	20%	35%	50%
NP: No inflation protection	5	24.4	6.8	0.999	0.978	0.751	0.049	0.000	27.6	6.4	1.000	0.994	0.882	0.118	0.000
	10	45.5	8.8	1.000	0.999	0.994	0.876	0.324	49.6	8.4	1.000	1.000	0.998	0.949	0.518
	15	60.8	8.5	1.000	1.000	1.000	0.994	0.892	65.0	7.9	1.000	1.000	1.000	0.998	0.954
	20	71.7	7.4	1.000	1.000	1.000	1.000	0.990	75.6	6.7	1.000	1.000	1.000	1.000	0.998
	25	79.6	6.1	1.000	1.000	1.000	1.000	1.000	83.0	5.4	1.000	1.000	1.000	1.000	1.000
P8: 100% CPI protection up to 5%	5	7.1	5.4	0.931	0.273	0.021	0.000	0.000	11.0	5.6	0.980	0.548	0.060	0.000	0.000
	10	16.9	9.3	0.986	0.742	0.361	0.034	0.001	23.2	9.5	0.996	0.920	0.619	0.110	0.002
	15	25.9	11.3	0.996	0.918	0.684	0.225	0.019	33.9	11.1	0.999	0.984	0.888	0.465	0.069
	20	33.9	12.3	0.999	0.974	0.860	0.470	0.097	43.0	11.6	1.000	0.996	0.970	0.757	0.284
	25	41.0	12.6	1.000	0.994	0.945	0.689	0.249	50.9	11.5	1.000	1.000	0.993	0.901	0.559
P9: 90% CPI protection up to 6%	5	6.8	4.7	0.985	0.229	0.012	0.000	0.000	10.7	5.1	0.986	0.539	0.042	0.000	0.000
	10	16.2	8.4	0.995	0.739	0.311	0.021	0.000	22.5	8.7	0.997	0.928	0.599	0.082	0.001
	15	24.8	10.3	0.998	0.932	0.654	0.168	0.010	32.8	10.4	0.999	0.988	0.891	0.415	0.047
	20	32.4	11.3	1.000	0.983	0.856	0.410	0.062	41.8	10.9	1.000	0.998	0.975	0.734	0.230
	25	39.3	11.6	1.000	0.997	0.951	0.642	0.185	49.4	10.9	1.000	1.000	0.995	0.897	0.500
P10: 80% CPI protection up to 6%	5	8.9	4.9	0.993	0.368	0.028	0.000	0.000	12.8	5.2	0.996	0.696	0.086	0.000	0.000
	10	20.0	8.5	0.998	0.887	0.473	0.049	0.001	26.1	8.7	0.999	0.973	0.749	0.154	0.004
	15	30.0	10.1	1.000	0.984	0.829	0.311	0.027	37.4	10.0	1.000	0.996	0.957	0.599	0.104
	20	38.6	10.8	1.000	0.998	0.961	0.626	0.148	47.1	10.3	1.000	1.000	0.994	0.873	0.401
	25	46.1	10.8	1.000	1.000	0.993	0.840	0.375	55.1	10.1	1.000	1.000	1.000	0.970	0.707
P.11: 60% CPI protection up to 6%	5	13.0	5.4	0.997	0.688	0.111	0.000	0.000	16.7	5.4	0.999	0.895	0.270	0.000	0.000
	10	27.2	8.6	1.000	0.986	0.789	0.189	0.004	32.7	8.6	1.000	0.996	0.931	0.405	0.020
	15	39.3	9.7	1.000	0.999	0.976	0.668	0.138	45.8	9.5	1.000	1.000	0.995	0.869	0.341
	20	49.3	9.9	1.000	1.000	0.998	0.921	0.488	56.3	9.3	1.000	1.000	1.000	0.985	0.761
	25	57.6	9.4	1.000	1.000	1.000	0.989	0.792	64.7	8.6	1.000	1.000	1.000	0.998	0.944
P12: 80% CPI protection up to 9%	5	6.0	2.8	0.991	0.089	0.001	0.000	0.000	10.0	4.1	0.991	0.497	0.008	0.000	0.000
	10	13.5	5.5	0.997	0.730	0.119	0.002	0.000	20.0	6.7	0.998	0.937	0.492	0.018	0.000
	15	20.6	7.0	0.999	0.964	0.482	0.034	0.001	29.0	8.1	1.000	0.991	0.876	0.221	0.007
	20	27.0	7.9	1.000	0.994	0.816	0.151	0.007	37.1	8.6	1.000	0.999	0.975	0.599	0.067
	25	32.9	8.3	1.000	0.999	0.958	0.377	0.031	44.1	8.8	1.000	1.000	0.995	0.854	0.250
P13: 60% CPI protection up to 9%	5	11.0	3.9	0.997	0.589	0.021	0.000	0.000	14.7	4.4	0.999	0.860	0.110	0.000	0.000
	10	22.8	6.6	1.000	0.982	0.658	0.042	0.001	28.7	7.1	1.000	0.995	0.889	0.184	0.002
	15	33.3	7.8	1.000	0.999	0.961	0.401	0.022	40.4	8.1	1.000	0.999	0.992	0.756	0.113
	20	42.3	8.2	1.000	1.000	0.996	0.814	0.169	50.2	8.2	1.000	1.000	0.999	0.962	0.529
	25	50.0	8.1	1.000	1.000	1.000	0.968	0.509	58.4	7.9	1.000	1.000	1.000	0.995	0.855
P14: 100% CPI protection from 2% to 9%	5	9.6	2.1	0.998	0.255	0.002	0.000	0.000	13.3	3.8	0.999	0.816	0.033	0.000	0.000
	10	19.3	4.1	1.000	0.990	0.335	0.004	0.000	25.4	5.7	1.000	0.995	0.838	0.048	0.000
	15	28.2	5.1	1.000	0.999	0.970	0.093	0.001	35.8	6.5	1.000	0.999	0.992	0.553	0.020
	20	36.1	5.6	1.000	1.000	0.997	0.519	0.020	44.9	6.7	1.000	1.000	0.999	0.933	0.210
	25	43.0	5.7	1.000	1.000	1.000	0.950	0.113	52.6	6.6	1.000	1.000	1.000	0.993	0.661

TABLE 8.3

ABSOLUTE AND RELATIVE PERCENTAGE LOSSES OF PENSION PURCHASING POWER WITH ALTERNATIVE PRICE INDEXING FORMULAS: MEANS, STANDARD DEVIATIONS, AND PROBABILITIES (INITIAL EXPERIMENTS)

		Absolute Losses							Relative Losses						
Formula	Years Since Retire-ment	Mean %	Std Dev %	Probability of loss in excess of --					Mean %	Std Dev %	Probability of loss in excess of --				
				0%	10%	20%	35%	50%			0%	10%	20%	35%	50%
NP: No inflation protection	5	24.4	6.8	0.999	0.978	0.751	0.049	0.000	27.6	6.4	1.000	0.994	0.882	0.118	0.000
	10	45.5	8.8	1.000	0.999	0.994	0.876	0.324	49.6	8.4	1.000	1.000	0.998	0.949	0.518
	15	60.8	8.5	1.000	1.000	1.000	0.994	0.892	65.0	7.9	1.000	1.000	1.000	0.998	0.954
	20	71.7	7.4	1.000	1.000	1.000	1.000	0.990	75.6	6.7	1.000	1.000	1.000	1.000	0.998
	25	79.6	6.1	1.000	1.000	1.000	1.000	1.000	83.0	5.4	1.000	1.000	1.000	1.000	1.000
W1: 100% WI protection	5	-4.5	4.4	0.150	0.000	0.000	0.000	0.000	0.0	0.2	0.000	0.000	0.000	0.000	0.000
	10	-8.5	6.5	0.090	0.002	0.000	0.000	0.000	0.0	0.4	0.000	0.000	0.000	0.000	0.000
	15	-12.6	8.3	0.059	0.002	0.000	0.000	0.000	-0.1	0.5	0.000	0.000	0.000	0.000	0.000
	20	-16.9	9.8	0.035	0.001	0.000	0.000	0.000	-0.1	0.6	0.000	0.000	0.000	0.000	0.000
	25	-21.3	11.4	0.023	0.001	0.000	0.000	0.000	-0.1	0.7	0.000	0.000	0.000	0.000	0.000
W2: 80% WI protection	5	1.9	4.1	0.682	0.020	0.000	0.000	0.000	6.1	1.6	0.998	0.005	0.000	0.000	0.000
	10	5.2	5.7	0.817	0.203	0.002	0.000	0.000	12.6	2.8	1.000	0.825	0.002	0.000	0.000
	15	8.5	6.8	0.892	0.430	0.036	0.000	0.000	18.6	3.5	1.000	0.988	0.361	0.000	0.000
	20	11.6	7.6	0.931	0.604	0.130	0.000	0.000	24.3	4.0	1.000	0.998	0.859	0.002	0.000
	25	14.7	8.1	0.958	0.731	0.270	0.002	0.000	29.5	4.3	1.000	1.000	0.981	0.085	0.000
W3: 60% WI protection	5	8.0	4.5	0.957	0.335	0.002	0.000	0.000	12.0	3.0	1.000	0.744	0.002	0.000	0.000
	10	17.3	6.3	0.994	0.877	0.347	0.001	0.000	23.7	4.9	1.000	0.993	0.781	0.007	0.000
	15	25.8	7.2	0.999	0.979	0.798	0.091	0.000	34.0	5.7	1.000	1.000	0.986	0.451	0.001
	20	33.4	7.6	1.000	0.997	0.950	0.439	0.006	42.8	6.0	1.000	1.000	0.999	0.896	0.103
	25	40.2	7.6	1.000	0.999	0.991	0.763	0.088	50.5	6.0	1.000	1.000	1.000	0.991	0.561
W4: 100% WI protection above 1%	5	0.3	4.2	0.533	0.009	0.000	0.000	0.000	4.6	0.3	0.999	0.000	0.000	0.000	0.000
	10	1.1	6.0	0.583	0.063	0.001	0.000	0.000	8.8	0.6	1.000	0.000	0.000	0.000	0.000
	15	2.0	7.3	0.622	0.132	0.004	0.000	0.000	12.9	0.7	1.000	0.986	0.000	0.000	0.000
	20	2.8	8.2	0.649	0.194	0.012	0.000	0.000	16.8	0.8	1.000	0.997	0.000	0.000	0.000
	25	3.7	9.1	0.674	0.255	0.028	0.000	0.000	20.5	0.9	1.000	0.999	0.910	0.000	0.000
W5: 100% WI protection above 2%	5	4.8	4.0	0.882	0.098	0.000	0.000	0.000	8.9	0.6	1.000	0.000	0.000	0.000	0.000
	10	9.8	5.5	0.958	0.502	0.024	0.000	0.000	16.9	0.9	1.000	0.996	0.000	0.000	0.000
	15	14.7	6.3	0.985	0.775	0.203	0.000	0.000	24.2	1.1	1.000	1.000	0.985	0.000	0.000
	20	19.2	6.8	0.995	0.906	0.467	0.004	0.000	30.8	1.2	1.000	1.000	0.999	0.000	0.000
	25	23.5	7.3	0.998	0.961	0.702	0.046	0.000	36.9	1.2	1.000	1.000	1.000	0.939	0.000
W6: 100% WI protection above 3%	5	9.0	3.9	0.987	0.410	0.001	0.000	0.000	12.9	0.9	1.000	0.980	0.000	0.000	0.000
	10	17.6	5.0	0.999	0.927	0.331	0.000	0.000	24.1	1.4	1.000	1.000	0.977	0.000	0.000
	15	25.5	5.6	1.000	0.994	0.838	0.035	0.000	33.8	1.6	1.000	1.000	0.999	0.015	0.000
	20	32.6	5.8	1.000	1.000	0.978	0.349	0.000	42.3	1.6	1.000	1.000	1.000	0.991	0.000
	25	39.0	5.8	1.000	1.000	0.998	0.766	0.021	49.6	1.6	1.000	1.000	1.000	1.000	0.584
W7: 80% WI protection above 2%	5	9.1	3.9	0.987	0.414	0.002	0.000	0.000	13.0	1.6	1.000	0.961	0.000	0.000	0.000
	10	18.4	5.0	0.999	0.947	0.391	0.000	0.000	24.8	2.6	1.000	0.999	0.957	0.000	0.000
	15	26.9	5.5	1.000	0.997	0.893	0.062	0.000	35.0	3.1	1.000	1.000	0.999	0.546	0.000
	20	34.5	5.7	1.000	1.000	0.988	0.487	0.001	43.8	3.2	1.000	1.000	1.000	0.985	0.011
	25	41.3	5.7	1.000	1.000	0.999	0.863	0.051	51.5	3.2	1.000	1.000	1.000	0.999	0.728

TABLE 8.4

ABSOLUTE AND RELATIVE PERCENTAGE LOSSES OF PENSION PURCHASING POWER WITH ALTERNATIVE WAGE INDEXING FORMULAS: MEANS, STANDARD DEVIATIONS, AND PROBABILITIES (ADDITIONAL EXPERIMENTS)

		Absolute Losses								Relative Losses					
				Probability of loss in excess of --							Probability of loss in excess of --				
Formula	Years Since Retirement	Mean %	Std Dev %	0%	10%	20%	35%	50%	Mean %	Std Dev %	0%	10%	20%	35%	50%
NP: No inflation protection	5	24.4	6.8	0.999	0.978	0.751	0.049	0.000	27.6	6.4	1.000	0.994	0.882	0.118	0.000
	10	45.5	8.8	1.000	0.999	0.994	0.876	0.324	49.6	8.4	1.000	1.000	0.998	0.949	0.518
	15	60.8	8.5	1.000	1.000	1.000	0.994	0.892	65.0	7.9	1.000	1.000	1.000	0.998	0.954
	20	71.7	7.4	1.000	1.000	1.000	1.000	0.990	75.6	6.7	1.000	1.000	1.000	1.000	0.998
	25	79.6	6.1	1.000	1.000	1.000	1.000	1.000	83.0	5.4	1.000	1.000	1.000	1.000	1.000
W8: 100% WI protection up to 5%	5	5.5	6.9	0.780	0.256	0.021	0.000	0.000	9.5	6.1	0.968	0.444	0.055	0.000	0.000
	10	14.6	11.0	0.905	0.647	0.318	0.032	0.001	21.1	10.3	0.995	0.843	0.531	0.096	0.002
	15	23.0	13.2	0.956	0.828	0.595	0.193	0.017	31.3	12.1	0.999	0.960	0.813	0.390	0.058
	20	30.5	14.5	0.978	0.915	0.767	0.399	0.084	40.2	12.8	1.000	0.991	0.936	0.665	0.236
	25	37.3	14.9	0.990	0.958	0.871	0.584	0.201	47.9	12.8	1.000	0.997	0.979	0.832	0.463
W9: 90% WI protection up to 6%	5	4.9	6.3	0.775	0.209	0.012	0.000	0.000	9.0	5.5	0.997	0.392	0.036	0.000	0.000
	10	13.3	10.2	0.905	0.608	0.257	0.019	0.000	19.9	9.4	0.999	0.839	0.473	0.065	0.001
	15	21.1	12.4	0.956	0.808	0.534	0.137	0.009	29.7	11.2	1.000	0.969	0.791	0.320	0.037
	20	28.1	13.7	0.978	0.903	0.722	0.317	0.050	38.2	12.0	1.000	0.994	0.932	0.603	0.167
	25	34.5	14.2	0.991	0.951	0.843	0.504	0.137	45.6	12.2	1.000	0.999	0.982	0.800	0.375
W10: 80% WI protection up to 6%	5	7.3	6.4	0.876	0.326	0.028	0.000	0.000	11.2	5.6	0.998	0.536	0.073	0.000	0.000
	10	17.5	10.0	0.967	0.760	0.400	0.045	0.001	23.8	9.3	1.000	0.945	0.635	0.128	0.003
	15	26.9	11.9	0.991	0.918	0.713	0.257	0.025	34.8	10.8	1.000	0.995	0.908	0.490	0.082
	20	35.1	12.7	0.996	0.973	0.877	0.512	0.119	44.2	11.3	1.000	0.999	0.985	0.785	0.312
	25	42.4	12.9	0.999	0.992	0.950	0.723	0.293	52.1	11.1	1.000	1.000	0.998	0.928	0.593
W11: 60% WI protection up to 6%	5	11.9	6.4	0.972	0.604	0.109	0.000	0.000	15.6	5.8	1.000	0.819	0.231	0.000	0.000
	10	25.5	9.7	0.996	0.947	0.708	0.170	0.004	31.2	9.0	1.000	0.995	0.886	0.344	0.017
	15	37.3	10.9	1.000	0.993	0.937	0.592	0.121	44.1	10.0	1.000	1.000	0.992	0.810	0.292
	20	47.1	11.1	1.000	0.999	0.989	0.860	0.420	54.5	9.9	1.000	1.000	0.999	0.970	0.687
	25	55.4	10.7	1.000	1.000	0.999	0.961	0.708	62.9	9.3	1.000	1.000	1.000	0.997	0.905
80% WI protection up to 9%	10	8.9	7.6	0.887	0.419	0.075	0.001	0.000	15.9	6.2	1.000	0.849	0.226	0.009	0.000
	15	14.4	9.4	0.943	0.677	0.265	0.022	0.000	23.8	7.8	1.000	0.989	0.648	0.090	0.004
	20	19.5	10.6	0.969	0.820	0.473	0.074	0.004	30.9	8.7	1.000	0.999	0.911	0.298	0.025
	25	24.4	11.3	0.987	0.901	0.652	0.173	0.014	37.4	9.1	1.000	1.000	0.988	0.577	0.093
W13: 60% WI protection up to 9%	5	8.9	5.2	0.959	0.406	0.021	0.000	0.000	12.8	4.1	1.000	0.749	0.056	0.000	0.000
	10	19.7	7.9	0.994	0.896	0.474	0.031	0.000	25.9	7.0	1.000	0.993	0.797	0.102	0.001
	15	29.4	9.2	0.999	0.983	0.846	0.267	0.015	37.1	8.1	1.000	1.000	0.987	0.584	0.061
	20	37.8	9.8	1.000	0.997	0.963	0.618	0.102	46.6	8.4	1.000	1.000	0.999	0.916	0.339
	25	45.3	9.7	1.000	1.000	0.994	0.854	0.323	54.6	8.2	1.000	1.000	1.000	0.992	0.713
W14: 100% WI protection from 2% to 9%	5	6.4	4.4	0.930	0.198	0.002	0.000	0.000	10.4	2.4	1.000	0.363	0.007	0.000	0.000
	10	14.2	6.4	0.990	0.749	0.169	0.002	0.000	20.9	4.7	1.000	0.997	0.453	0.015	0.000
	15	21.7	7.6	0.999	0.943	0.582	0.045	0.001	30.3	5.8	1.000	1.000	0.991	0.186	0.007
	20	28.4	8.3	1.000	0.987	0.852	0.199	0.009	38.5	6.3	1.000	1.000	1.000	0.668	0.054
	25	34.5	8.6	1.000	0.998	0.960	0.469	0.039	45.8	6.4	1.000	1.000	1.000	0.986	0.234

TABLE 8.5

ABSOLUTE AND RELATIVE PERCENTAGE LOSSES OF PENSION PURCHASING POWER WITH ALTERNATIVE EXCESS EARNINGS FORMULAS: MEANS, STANDARD DEVIATIONS, AND PROBABILITIES

Formula	Years Since Retirement	Absolute Losses							Relative Losses						
		Mean %	Std Dev %	Probability of loss in excess of --					Mean %	Std Dev %	Probability of loss in excess of --				
				0%	10%	20%	35%	50%			0%	10%	20%	35%	50%
NP: No inflation protection	5	24.4	6.8	0.999	0.978	0.751	0.049	0.000	27.6	6.4	1.000	0.994	0.882	0.118	0.000
	10	45.5	8.8	1.000	0.999	0.994	0.876	0.324	49.6	8.4	1.000	1.000	0.998	0.949	0.518
	15	60.8	8.5	1.000	1.000	1.000	0.994	0.892	65.0	7.9	1.000	1.000	1.000	0.998	0.954
	20	71.7	7.4	1.000	1.000	1.000	1.000	0.990	75.6	6.7	1.000	1.000	1.000	1.000	0.998
	25	79.6	6.1	1.000	1.000	1.000	1.000	1.000	83.0	5.4	1.000	1.000	1.000	1.000	1.000
X1: Baseline Formula (K=.07, A=.02, C=.06)	5	2.7	10.3	0.627	0.245	0.034	0.000	0.000	6.7	11.0	0.743	0.408	0.105	0.001	0.000
	10	8.4	17.5	0.711	0.508	0.271	0.042	0.001	15.1	18.1	0.809	0.654	0.436	0.121	0.007
	15	13.8	22.0	0.763	0.616	0.431	0.160	0.021	22.6	22.0	0.852	0.755	0.602	0.318	0.078
	20	18.8	24.9	0.803	0.690	0.540	0.275	0.072	29.5	24.1	0.887	0.817	0.712	0.470	0.194
	25	23.4	27.0	0.829	0.741	0.618	0.379	0.140	35.6	25.4	0.910	0.860	0.781	0.587	0.316
X2: Low Trigger Rate (K=.05)	5	-7.5	11.5	0.265	0.053	0.002	0.000	0.000	-3.1	12.3	0.425	0.139	0.017	0.000	0.000
	10	-11.7	21.6	0.318	0.151	0.049	0.003	0.000	-3.6	22.3	0.479	0.295	0.133	0.018	0.001
	15	-16.1	30.0	0.321	0.191	0.093	0.017	0.001	-4.2	29.9	0.496	0.352	0.215	0.064	0.007
	20	-20.8	37.4	0.313	0.206	0.114	0.029	0.003	-4.9	36.1	0.510	0.383	0.257	0.105	0.019
	25	-26.0	44.8	0.310	0.211	0.124	0.041	0.006	-5.8	42.0	0.517	0.405	0.296	0.141	0.038
X3:High Trigger Rate (K=.09)	5	11.3	9.1	0.887	0.584	0.165	0.000	0.000	14.9	9.6	0.931	0.716	0.322	0.007	0.000
	10	23.9	14.1	0.939	0.837	0.645	0.221	0.012	29.4	14.6	0.963	0.897	0.762	0.393	0.052
	15	34.7	16.2	0.969	0.921	0.828	0.540	0.165	41.4	16.2	0.981	0.956	0.896	0.703	0.329
	20	43.9	16.7	0.983	0.961	0.911	0.742	0.399	51.3	16.2	0.992	0.981	0.955	0.854	0.600
	25	51.7	16.6	0.991	0.979	0.950	0.854	0.608	59.5	15.5	0.995	0.990	0.978	0.927	0.778
X4: Low Fund Return Rate (A=.00)	5	11.9	9.0	0.901	0.609	0.182	0.001	0.000	15.5	9.5	0.938	0.736	0.347	0.008	0.000
	10	24.9	13.9	0948	0.856	0.668	0.245	0.015	30.4	14.3	0.969	0.910	0.784	0.419	0.060
	15	36.0	15.8	0.974	0.932	0.848	0.573	0.185	42.6	15.8	0.985	0.964	0.910	0.727	0.356
	20	45.4	16.2	0.987	0.970	0.924	0.776	0.435	52.7	15.7	0.993	0.985	0.963	0.873	0.634
	25	53.4	15.9	0.993	0.984	0.962	0.876	0.646	60.9	14.9	0.997	0.992	0.983	0.939	0.806
X5: High Fund Return Rate (A=.04)	5	-8.1	11.6	0.248	0.047	0.002	0.000	0.000	-3.7	12.4	0.408	0.129	0.015	0.000	0.000
	10	-13.0	21.8	0.295	0.136	0.042	0.002	0.000	-4.8	22.6	0.457	0.274	0.122	0.016	0.000
	15	-18.2	30.5	0.298	0.173	0.080	0.014	0.001	-6.1	30.5	0.472	0.330	0.195	0.055	0.006
	20	-23.8	38.3	0.286	0.184	0.099	0.024	0.002	-7.4	37.0	0.482	0.353	0.236	0.093	0.016
	25	-29.8	46.2	0.279	0.188	0.109	0.034	0.005	-9.1	43.3	0.484	0.374	0.270	0.123	0.032
X6: Low Contingency Reserve (C=.02)	5	3.8	10.0	0.667	0.274	0.040	0.000	0.000	7.7	10.7	0.774	0.441	0.118	0.001	0.000
	10	10.5	16.8	0.753	0.553	0.308	0.050	0.001	17.0	17.4	0.836	0.692	0.475	0.139	0.009
	15	16.7	21.0	0.803	0.670	0.483	0.191	0.027	25.2	20.9	0.880	0.793	0.651	0.357	0.093
	20	22.4	23.4	0.844	0.741	0.599	0.322	0.091	32.7	22.6	0.913	0.855	0.760	0.522	0.226
	25	27.6	25.1	0.869	0.795	0.678	0.440	0.178	39.2	23.6	0.933	0.892	0.824	0.649	0.364
X7: High Contingency Reserve (C=.10)	5	1.6	10.7	0.585	0.220	0.029	0.000	0.000	5.6	11.4	0.706	0.377	0.093	0.001	0.000
	10	6.2	18.3	0.666	0.461	0.234	0.034	0.000	13.0	18.9	0.774	0.609	0.397	0.104	0.006
	15	10.6	23.3	0.714	0.561	0.379	0.132	0.018	19.7	23.3	0.818	0.708	0.551	0.276	0.064
	20	14.7	26.6	0.750	0.626	0.478	0.231	0.055	25.9	25.8	0.857	0.775	0.661	0.409	0.162
	25	18.4	29.3	0.778	0.677	0.551	0.317	0.108	31.5	27.5	0.881	0.818	0.728	0.523	0.269

NOTE: K stands for Trigger Rate in the Formula Definitions; A stands for Fund's Long-Run Difference from 3-month Treasury Bill Rate; C stands for proportion of Fund held as Contingency Reserve. Unless otherwise stated, K, A, and C have the values specified in the Baseline Formula.

IX SUMMING UP

We began, in Section II of the report, by discussing briefly some of the issues that seem important in the context of inflation protection from the point of view of an individual pensioner. The devastating effect of inflation on an unprotected pension was noted and alternative protection formulas were discussed, including the selection of the indexing standards that might be required by such formulas. The question of whether pensioners should share in the gains from technological advances (and economic progress generally) was introduced as an important issue underlying the choice of a protection formula. The question of whether inflation protection would be introduced comprehensively from the beginning or phased in over time was then raised. The significance of uncertainty about future inflation was discussed, and the fact that formulas vary in the degree of uncertainty that they imply was emphasized; further in this connection, the question of whether the individual pensioners or the employer should bear the burden of this uncertainty was raised. The increased life span of the older population and the tendency towards earlier retirement were noted as factors that affect the average length of time that pensioners will live, and hence the length of time that their pensions will be subject to the effects of inflation. Questions of the 'needs' of the elderly and how well or badly off the elderly are in present-day Canada or Ontario were noted. The effects of the tax system on the purchasing power of the older population and the availability of senior citizen discounts and subsidies were noted also as relevant issues, although not ones addressed in the present report. The possibility of saving and work disincentives as a result of inflation protection were taken note of, in light of the considerable literature that exists on the disincentive effects of social security; however, it was suggested that this literature is inconclusive, on the whole, and that such effects are unlikely to be of first-order importance in the context of inflation protection. Finally, the question of the timing of inflation adjustments was discussed, it being pointed out that some loss of pension purchasing power occurs because of lags and intervals between adjustments; in particular, if there is continuous inflation an annual adjustment scheme implies some loss of purchasing power relative to a quarterly one, and a quarterly adjustment scheme implies some loss relative to a monthly one.

Section III was concerned with an evaluation of the income and asset positions of the elderly population. The distinction between cohort experience and cross-section evidence was noted as important in the evaluation of the statistical evidence: ideally one would like to follow a cohort of people through time as they age, and observe how their incomes and asset holdings change, although the available data do not always permit this. On that basis, it appears that incomes do decline with age, but less so than cross-section data alone would suggest. There is certainly evidence of poverty among the older population; however, the evidence suggests that this has more to do with the distribution of income within that population than with average levels for the population as a whole. The evidence with regard to assets holdings is less abundant than the income evidence and we were unable to do a proper cohort analysis of assets held by the elderly. However, cross-section survey data suggest that wealth declines much less rapidly with age than does income; indeed, there is evidence that cohorts continue to accumulate wealth into very old age, if their circumstances permit. This latter finding runs counter to the well known life cycle theory of consumption in economics.

Section IV dealt with the question of how expenditure patterns vary as people grow older. It was noted there that average levels of consumer expenditure fall with age within the elderly population and that the distribution of total expenditure across major categories changes also, with food and housing accounting for increasingly large proportions. However, the difficulties in interpreting such results as evidence of changes in 'needs' were emphasized, as was the difficulty of giving a meaningful definition to the term 'needs' itself. For households (spending units) with heads 75 or older, there is evidence to indicate that average expenditure levels would be lower even if income were not, but the lack of suitable information about health status leaves open the question of whether reduced consumption is in substantial degree a consequence of poorer average health, and the curtailment of activities which that implies. It is found that even at the same income levels there are still age differences in expenditure proportions but the differences are much smaller than the unadjusted data would suggest. In sum, the question of how 'needs' vary with age is difficult to answer (and even to define properly) but the indications are that much of the observed variation in consumer expenditure can be explained by age-related income declines and there is the strong possibility that the remaining variation is in large part a reflection of health differences.

The relationship between age and inflation was explored in Section V. Annual price indexes were constructed for individual age groups for the period 1971-86, using essentially the same methods as are used by Statistics Canada in constructing the Consumer Price Index but allowing for age differences in expenditure patterns. These indexes were then compared with the 'official' all-Canada CPI. It was found that the age-group indexes conformed very closely with the CPI. It was found also that this was true whether the expenditure pattern for each group was based on all-Canada expenditure data or on Ontario data. Our conclusion is therefore that the all-Canada CPI would likely be a satisfactory indexing standard for Ontario pensions if a price indexing formula were to be adopted.

The available statistical series that might be used as indexing standards were reviewed in Section VI. Price indexing series include the all-Canada CPI, the National Accounts price index for personal expenditure on consumer goods and services, CPI series for three individual Ontario cities (or combinations of the city indexes), the Statistics Canada CPI for 'low-income senior citizens', and indexes that could be constructed specially to represent the older population of Ontario. In light of the results reported in Section VI it was concluded that the 'official' all-Canada CPI would be the most appropriate choice from this set. If a wage-related indexing series were to be required, the possibilities include the 'industrial aggregate' average weekly earnings and average hourly earnings series provided by the Statistics Canada monthly Survey of Employment, Earnings, and Hours. Both the average weekly and the average hourly series are available for Ontario as well as for all of Canada.

Three general types of inflation protection formulas were defined and discussed in Section VII. These three are price indexing formulas, wage indexing formulas, and formulas based on 'excess' pension fund earnings. Various specifications of formulas within the three broad categories were presented as ones to be tested experimentally in subsequent computer simulation experiments. The specific price and wage indexing formulas chosen for this purpose included ones that provide full protection (against price or wage inflation, as the case may be), ones that provide fractional protection, ones that have minima or maxima built into them, and various combinations. The 'excess' earnings formulas specified included ones with different definitions of 'excess' (i.e., different 'trigger rates', as we have termed them). They also made provision for different characteristics of the pension fund itself -- in particular, different long-run average earnings and different allowances for contingency reserves. It was noted that the definition of an excess earnings formula involves some very specific assumptions, and that the definitions that we have chosen should be regarded as illustrative rather than as precise definitions of formulas that might actually be implemented.

The results of the computer simulation experiments themselves were presented in Section VIII. In total, 35 different formulas were tested by generating 10,000 possible future scenarios, based on a statistical model fitted to historical data and allowing for random or unpredictable future changes in inflation rates and the rate of interest. (Inflation rates were represented by changes in the all-Canada CPI and 'industrial aggregate' average weekly earnings; the rate of interest was represented by the annual rate on 3-month treasury bills.) Means, standard deviations, and various probabilities were calculated on the basis of the 10,000 experiments and results were presented in terms of losses of absolute pension purchasing power (i.e., relative to the CPI) and relative pension purchasing power (i.e., relative to average weekly earnings). It was noted that some formulas imply less uncertainty than others about the future real value of a pension. Pensions with 100 per cent protection above a minimum inflation rate tend to provide greater certainty than ones with no minima but only fractional protection (e.g., 80 per cent or 60 per cent). However, the greatest amount of uncertainty by far was that associated with excess earnings formulas, inasmuch as these add the uncertainty about individual pension fund performance to the general uncertainty about future inflation and interest rates in the economy at large. Two different formulas may provide the same protection in an average sense (the mean or 'expected average' losses may be the same) but involve quite different degrees of uncertainty as to what the actual future outcome will be.

NOTES TO SECTION III

1. The term ‘replacement ratio’ is used here to refer to the ratio of average pre-tax income after retirement to the average before retirement. The comparison sometimes involves after-tax income levels or other appropriate measures. Replacement ratios based on consumption were considered in Denton, Kliman and Spencer (1981).

2. Kennedy (1987) has analyzed the late career age profiles of earnings of cohorts of Canadian men and women using a sample of longitudinal earnings records drawn from Canada Pension Plan administrative files. He finds that ‘the profiles of expected earnings of older workers, by age, are roughly constant into the early sixties, with sharp declines in the 63-65 years of age range . . . Further analysis suggests that the apparent pre-65 earnings decline is a ruse of aggregation associated with the heavy attrition through retirement . . . A simple adjustment eliminates the pre-65 decline phenomenon, leaving roughly constant profiles . . ." (p.2)

3. We note a recent U.S. study that rejects the hypothesis that incomes of the elderly are more vulnerable to inflation than the incomes of other groups: ‘We find that older persons do not live on fixed nominal incomes. Data from the Retirement History Study show that income sources of the elderly were not fixed in nominal terms but increased as prices rose’ (Clark and Sumner, 1985, p. 146). Elsewhere Clark, Maddox, Schrimper, and Sumner (1984) state baldly ‘The hypothesis that the elderly have been adversely affected by inflation relative to the population at large in the past decade is rejected by the evidence.’ (p. 120) A study by Hurd and Shoven (1982) of how the income and asset position of the elderly changed over the high inflation decade of the 1970s finds that ‘the elderly have higher per capita incomes than the non-elderly and they gained on the rest of the population in the first eight years of the 1970s.’ (p. 315) (Their definition of income includes imputed returns from housing and income from Medicare and Medicaid.) Danziger, van der Gaag, Smolensky, and Taussig (1984) reach a similar conclusion: ‘the elderly of today are certainly at least as well off on average as the non-elderly.’ (p. 186) With respect to asset holdings, Hurd and Shoven conclude that ‘almost all of the elderly of this age group [those aged 58-63 in 1969] are insulated from increases in inflation. This is because housing and Social Security comprise most of the assets of most elderly’ (p. 317).

4. The ‘families’ in the SCF are what Statistics Canada defines as economic families -- that is, a group of individuals sharing a common dwelling unit and related by blood, marriage, or adoption.

5. A similar observation is reported in a recent U.S. study: "[1980 census information] shows that income from assets for elderly cohorts increases

until the cohort aged 85 years and over. This pattern is similar for different sex-marital groups.' (Torrey and Taeuber, p. 443) Schulz (1985, p. 29) suggests that continued asset accumulation might be explained as a precautionary reaction against medical expenses, nursing home care, and so on.

6. A recent U.S. study by McDermed, Clark, and Allen (1987) develops estimates of pension wealth and compares them to other components of wealth. Depending on the approach adopted, they find that average pension wealth represents as much as two-fifths of the average net worth of households with pension coverage.

7. Oja (1987) provides an analysis of changes in wealth distribution in Canada using the SCF wealth surveys taken in 1970, 1977, and 1984. However, her work does not adopt a cohort perspective.

8. Burbidge and Robb (1985), for example, have estimated wealth-age profiles for Canada, and find that those married couple households classified as 'white collar' continue to accumulate assets during retirement, while 'blue collar' households decumulate. In a more recent study also restricted to married couples they conclude that 'one cannot reject the notion that wealth-age profiles are upward sloping.' (Robb and Burbidge, 1987, p. 27)

NOTES TO SECTION IV

1. A spending unit is defined in the Survey of Consumer Expenditures as a group of persons dependent on a common or pooled income for the major items of expense and living in the same dwelling, or as one financially independent individual living alone. Never-married sons or daughters living with their parents are considered as part of their parents' spending unit.

2. We note that investment income and all other income combined appear separately in the total expenditure equation. For one-person spending units average investment income in 1982 was approximately $2700 and all other income approximately $8500; for two-person units the corresponding figures were $4200 and $19,100.

3. We note that Robb and Burbidge (1987), in a recent study that uses microdata from several Family Expenditure Surveys conducted between 1969 and 1982, have derived age-consumption profiles using an approach quite different from the one adopted here. They estimate separate age-consumption and age-income profiles and find the shapes of the two to be very similar -- both generally decline with age in the several years preceding retirement, decline again sharply at the time of retirement, and continue to decline during the retirement years.

4. Our general conclusion appears to be in line with that of Heslop (1986), who worked with pooled data from the 1969, 1974, 1976, 1978, and 1982 Surveys of Family Expenditure to assess the relative impact of age and income on expenditures of the elderly. She concluded that 'the fundamental importance of monetary resources [is evident in accounting for] the lifestyle patterns of the elderly. . . . Age is much less of a constraint. Given the resources, the elderly would appear to seek to maintain pre-retirement lifestyles. Any declines in activities or disengagements are not significant until after 75 years of age.' (p. 36)

NOTES TO SECTION V

1. Specifically, we have added to reported shelter expenditure an allowance to represent the depreciation component on owner-occupied housing. Following Statistics Canada practice, houses are assumed to depreciate at 2 per cent per year; hence 2 per cent of the 'value of dwelling' is included as a shelter expenditure. It should be noted that the value of dwelling refers only to the structure and not to the land on which it rests. Based on a CMHC estimate of the national average ratio of value of dwelling to value of dwelling plus land, we have assumed for all owner-occupied households that 73 per cent of the estimated market price of the property relates to the building, as such. In the official CPI calculations the proportion varies from one urban centre to another; however, it is not possible to make this adjustment when working with the Statistics Canada public use sample tape. We are grateful to Mr. Hugh Scobie of the Prices Division of Statistics Canada for describing the Statistics Canada practice, and also for several discussions relating to other aspects of the price index calculations.

2. Based on a consumer price index constructed for the U.S. using expenditure weights that are appropriate for the elderly population Bridges and Packard (1981) conclude that '...over the 1967-79 period the movement of this constructed index was very similar to that of the economy-wide index.' (p.3) Their conclusion is representative of a number of other U.S. studies. Schulz (1985) concludes 'Rarely has there been such agreement among economists on research findings. All studies have found that the differences between the CPI and a special aged index are likely to be very small.' (p.44)

NOTES TO SECTION VII

1. A recent study carried out for the U.S. National Bureau of Economic Research is perhaps worth citing with regard to the matter of inflation uncertainty. Patel and Zeckhauser (1987) find that 'By buying futures contracts on Treasury bills, investors can eliminate 30 to 40 per cent of the risk that inflation will erode the real value of their assets.' The remaining 60 to 70 per cent may be viewed as the proportion of inflation risk that cannot be eliminated by hedging. This finding, while not directly relevant to the issue of pension purchasing power erosion, does indicate the amount of uncertainty that exists even among sophisticated investors, let alone the average unsophisticated pensioner.

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Pension Funding Assumptions And Pension Indexation

Keith P. Sharp

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Pension Funding Assumptions And Pension Indexation

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I INTRODUCTION

A Background To This Paper

The Ontario Task Force on Inflation Protection for Employment Pension Plans, chaired by Prof. Martin Friedland, was set up by the Ontario Government on December 9, 1986. The mandate of the Task Force is to 'determine the most appropriate formula and phase-in procedures for inflation protection'. This paper is among those which will be considered by the Task Force before making a recommendation.

B Matters Addressed In This Paper

In this paper are discussed the actuarial assumptions and methods used when performing a valuation of a pension plan and the various factors which influence the actuary's choice of assumption. Under both pre-1987 ((12), Section 5) and post-1987 ((11), Section 14) provincial pension legislation a defined benefit pension plan (see glossary) must be valued by an actuary no less frequently than once every three years. Furthermore, the Pension Commission of Ontario requires that the current service employer contribution for a given year be at least as large as that certified by the actuary as being appropriate and that unfunded liabilities be amortized over specified periods ((9), Sections 4(2), 5(1), 13(2)). The actuary's certificate is also used by Revenue Canada in determining the allowability as a business expense of the employer's contribution to the pension plan (13). Thus the costing results produced by an actuary have great influence.

The actuary certifies both the current service annual cost and the amount of the surplus or unfunded liability (see glossary). Both these amounts depend on the assumptions used by the actuary. The value placed on a benefit promise depends on several imponderables, including the future rate of investment return on the fund, the rate of future salary rises and the percentage of employees who will remain in their current employment until retirement. Therefore, of necessity, the actuary's estimate of the available surplus will be very approximate. Surplus cannot be measured with as much accuracy as the total in a person's bank account or even with the degree of accuracy which one might expect in a prediction of the Federal government's budget deficit three years hence. In performing a valuation to determine a plan's true cost the actuary is aiming at a very fuzzy target. Fortunately, the aim can be adjusted at least once every three years.

C Defined Contribution Plans

Under a defined contribution (money purchase) plan, the specified employee and employer contributions are accumulated until they result in a lump sum at retirement. The lump sum is generally used to purchase a monthly annuity from an insurance company. Defined contribution plans are simple to operate.

They have the disadvantage that the pension which can be purchased depends on the investment performance of the fund. It is difficult to predict the pension as a fraction of final pay, so in a broad sense employee benefit security is not well safeguarded. It would be relatively simple to mandate that only indexed annuities could be purchased by the proceeds of defined contribution plans, and insurance companies could be expected to respond by marketing suitable indexed annuities. The mandating of annuities which increase at 60% of the Consumer Price Index would, under the assumptions of Section III, result in the initial rate of annuity payment being about 80% of the amount which it would be in the absence of indexation. A possible response would be to increase the contribution rate specified in the plan. Actuarial valuations of defined contribution plans are not required since there is no attempt to fund a specified level of benefits. Thus the rest of this paper does not apply to defined contribution plans.

D Defined Benefit Plans

There are three common types of defined benefit plans: flat benefit, career average and final average pay plans.

Under a flat benefit plan, the pension might be specified as '$15 per month per year of service'. Although the $15 rate might be subject to revision, perhaps as a result of union negotiation, in performing actuarial valuations no provision for increase in the $15 rate during active service would be made. Indeed no provision for such an increase would be allowed by Revenue Canada (13). However, if indexation were mandated, then actuarial valuations would include provision for post-retirement pension increases from the $15 base assumed to apply at retirement. This would be accomplished by revision of the annuity purchase factor ((8), p. 121). This factor determines the lump sum at retirement which, on the average, would provide a pension of $1 per annum for the remaining lifetime. A provision for post-retirement indexation at 60% of the consumer Price Index would increase this annuity purchase factor by approximately 30%, the precise amount depending on the assumptions used.

Under a career average plan, the retirement benefit is expressed as, for instance, '2% of the total career earnings'. This is the same as '2% of the average annual career earnings multiplied by the number of years of service'. Mandatory indexation would be reflected in valuations primarily through the same modification to the annuity purchase factor as would be made for flat benefit plans.

Under a final average pay plan, the retirement benefit might be expressed as '1.5% of the average annual earnings over the last three years of service, multiplied by the number of years of service'. Again, mandatory indexation only affects retirement benefits after retirement and would be reflected in valuations through the same modification to the annuity purchase factor as would be made for flat benefit plans.

Retirement benefits dominate costing of a pension plan. For active members of flat benefit, career average and final pay plans the current service (normal) cost and the accrued liability for retirement benefits affected by the indexation both increase in the same proportion as the increase in the annuity purchase factor. For already retired persons at ages above the normal retirement age, the proportional increase in annuity factor will be less but is the same for all three types of defined benefit plans. Thus in the rest of this paper there is no need to distinguish between flat benefit, career average and final pay plans.

E Excess Interest Approach

Use of the excess interest approach to indexation was recommended by the Canadian Association of Pension Supervisory Authorities ((2), p. 5) and continues to be of interest despite its rejection by the federal parliamentary task force ((15), p. 48). If all fund return over a 'guide rate' (3.5% for prospective indexation, 7% for the retrospective portion where 'retrospective' refers to pensions earned before the date of legislation and does not include catch-up of past inflation) were to be used to increase pensions in payment, then actuaries would calculate the annuity factor using the interest rate currently assumed minus the guide rate. For prospective pensions the use of 3.5% interest in the calculation of the annuity would compare with the use of approximately 4.8% (7.5 - 0.6 x 4.5) under mandatory indexation at 60% of the Consumer Price Index under the assumptions of Section III. Thus the annuity factor under the excess interest proposal would be higher than under 60% indexation and higher funding recommendations would result. This is a reflection of the fact that under the assumptions of Section III, the excess interest proposal with a 3.5% guide rate would lead to greater increases to pensions. For retrospective indexation, the use of a 7% guide rate would increase actuarial funding rates in plans where annuity rates are currently calculated at more than 7% per annum, but to a small extent since in Ontario few plans are funded using an interest assumption significantly above 7% per annum. To the extent that actual yields above 7% emerged in future years, the true economic cost resulting from a 7% guide rate would be significant.

The use of either indexation to a proportion of the Consumer Price Index or the excess interest approach affects actuarial funding amounts through the impact on the annuity factor, and the rest of this paper can be regarded as applying to either type of pension escalation.

II ACTUARIAL ASSUMPTIONS

A Necessary Assumptions

In valuing a defined benefit pension plan, the actuary must make a large number of assumptions in the attempt to place a dollar value on the future unknown number of pensions of unknown amounts. An example of actuarial methodology is given in Chapter 10 of (8). Some plans require more assumptions than others. For a plan with retirement pension based on final salary it is clearly necessary to make an assumption about future salary rises. For a flat benefit plan with a benefit definition such as 'a pension of $15 per month for each year of service' it is not necessary to make an assumption about future salary rises. It would be rare for an actuary to assume future increases, perhaps as a result of collective bargaining, in the $15 rate. Nonetheless, for most plans, the actuary must make several and perhaps most of the assumptions in the following list, which is taken from the professional standards documentation of the Canadian Institute of Actuaries ((5), Section 3.03).

1. Economic Assumptions

(i) investment return
(ii) salary increases
(iii) development of government plans
(iv) post-retirement pension adjustments

2. Decremental Assumptions

(i) incidence of normal, early and deferred retirement
(ii) disability and disability recovery
(iii) voluntary and involuntary termination
(iv) mortality before and after retirement or disability

3. Other Assumptions

(i) family composition
(ii) marriage: marital status at termination, death, retirement; age differences between spouses; remarriage and divorce rates
(iii) the level of administration expenses
(iv) election of optional forms of benefit
(v) number of hours worked by hourly-paid employees
(vi) the current compensation base upon which the salary increases are to apply
(vii) future new entrants to the plan

The future development of government plans affects the cost of employment pension plans which have benefits and contributions designed to 'integrate' (see glossary) with the Canada Pension Plan. Marital status assumptions are necessary because, for example, the value placed on a post-retirement surviving spouse benefit depends on the proportion of employees assumed to be married at retirement. It is not claimed that the above list is exhaustive, but it does give an indication of the complexity of an actuarial valuation and of the wide variety of assumptions necessary.

B Considerations in Choosing Assumptions

The choice of actuarial assumptions is a matter of judgement. The choice of assumptions, as opposed to the mathematics of the funding calculations, is 'a subjective realm of actuarial art' ((1), p. 106). Assumptions are chosen, and may be changed, at each actuarial valuation. The professional standards documentation of the Canadian Institute of Actuaries ((5), Section 3.01) reads in part:

> 'The actuarial assumptions selected should reflect the actuary's judgement of future events affecting the related actuarial value. They should take into account the actual experience of the covered group to the extent that information is available and applicable, but in recognition of the nature of a pension plan, they should also reflect expected long term trends rather than give undue weight to recent past experience. The actuary may take into account general or specific information available from other sources, including the plan sponsor, plan administrator, investment managers, accountants and economists.'

The professional standards documentation requires that assumptions be disclosed in the valuation report and that the actuary state that in his opinion the assumptions are 'adequate and appropriate' for the purposes of the valuation.

In deciding upon assumptions such as rates of resignation and rates of early retirement which vary greatly from employer to employer, the experience of the employer whose plan is being valued would usually be examined. In choosing rates of investment return and rates of salary increase, historical economic statistics such as (3) would be examined in the light of current market conditions. A commonly held view is that the future fund earning rate, which corresponds to the interest rate assumption, is difficult to accurately predict in the light of historical variations in yield rates. However, the 'gap' or 'spread' between the interest rate and the salary increase rate, both of which are affected by inflation, should over the long term be more stable. At the present time, a common choice of a pair of interest rate/salary assumptions (e.g. 7% / 6%) would be one in which the interest rate exceeded the salary increase rate by between 1/2 and 1-1/2%. The choice is affected by considerations of the salary increase prospects for a particular industry, and the mix of assets held by the particular fund. In particular, consideration should be given to the riskiness of assets held by a fund.

The choice of actuarial assumptions involves making a judgement designed to balance several competing factors. A decision about a given assumption such as the interest rate is made mainly with a view towards choosing a value which fairly represents the expected future value of the item. However it is reasonable to wish to render improbable the scenario of plan termination with assets insufficient to pay accrued benefits. Thus, concern for the future pensions of the employees is likely to result in the choice of assumptions somewhat more conservative than a true 'best estimate'. Such conservatism is unlikely to be extreme, partly because the assumptions may have to be justified to the employer. Sometimes an employer's bias will be towards using conservative assumptions and making the maximum possible tax-deductible pension plan contribution. However, it is more common for an employer to prefer to pay as small a pension contribution as can be justified as being sound. This desire has been significantly intensified in recent months by the moratorium on the withdrawal of surplus. The employer's influence on the choice of assumptions is limited by the actuary's need to satisfy the requirement in the professional conduct documentation to choose assumptions which he or she regards as 'adequat and appropriate', and indeed cases of improper pressure on actuaries are relatively rare. Realistically, the demand for actuarial services is so great that there is little temptation for even a hypothetical unprincipled actuary to break the professional code of ethics and risk losing his or her hard-won professional qualification in an effort to retain a client's business.

The term 'actuarial method' refers to the manner in which the cost of future pensions is spread over the years of service of an employee. Terms such as 'unit credit' and 'entry age normal' (see (1)) refer to various formulas used by actuaries. For instance, under the unit credit method, the accrued liability is taken as being equal to the present value of the pension earned to date under the terms of the plan, using the current salary to calculate that pension. Under the projected unit credit method, the accrued liability is calculated assuming equal annual accruals of the pension benefit at retirement, with salaries projected to retirement in calculating that benefit. The choice of method and the choice of assumptions can each have a dramatic effect on pension current service cost and accrued liability and hence surplus.

The choice of method depends on the purpose of the valuation. The methods and assumptions used for a triennial funding valuation may differ from those used in a valuation for accounting purposes or in a valuation performed to aid in the distribution of assets on plan wind-up or company merger. For instance, in a wind-up situation the market value of assets is all-important, while in the funding valuation of an ongoing plan stability of contribution levels may require that a smoothed market value of assets be used.

The Canadian Institute of Chartered Accountants in April 1986 adopted new recommendations for the expensing of pension obligations (6). It should be emphasised that the annual amount used for expensing purposes is chosen with a view to making a correct charge against company earnings for the given period. The annual expensing amount and the calculated liability are important when determining company profitability and the value of company stock. Consistency between different accounting periods is crucial, as is the use of allocation methods consistent with accounting principles. Consistency between different companies is regarded as being less crucial. In contrast, the actuarial valuation for funding purposes determines how much money is actually paid into the fund, and is made with benefit security very much in mind. The 1986 CICA requirements are intended to impose a uniform method (the projected unit credit method) for valuations for expensing purposes. However, the assumptions to be used are 'management's best estimate' ((6), Section 3460.16). It is possible that the best estimates of managements of employing companies will differ substantially from company to company in which case true consistency will not exist. It is interesting to note that the United States Financial Accounting Standards Board issued Statement of Accounting Standards No. 87 'Employers' Accounting for Pensions' in December 1985. While generally comparable with the CICA requirements, FASB87 requires that the interest rate should be selected with a view to generally observable items including annuity rates and the price of fixed income investments ((9), par. 44). Thus the U.S. requirements may lead to a somewhat greater degree of uniformity of expensing assumptions from company to company but perhaps less uniformity on a year to year basis.

C Government Constraints On Assumptions

In Ontario, the actuary's choice of assumptions is constrained by the need to satisfy the Pension Commission of Ontario that funding is adequate (for example the interest assumption is not to be too high) and, on the other hand, satisfy Revenue Canada that the funding, and hence tax deduction, is not excessive.

The interest rate, salary increase and inflation rate assumptions have less employer-to-employer variation than most other assumptions, and in view of their importance the government authorities tend to check these assumptions more rigorously. A high interest assumption gives a relatively low present value of future benefits and hence a relatively slow rate of funding. Conversely, a high salary increase assumption results in faster rate of funding.

The Pension Commission of Ontario has effective veto power over the choice of method and assumptions. Both the outgoing Regulation 746, ((12), Section 7(1)) and the proposed new regulation ((11), Section 15) contain the phrases:

> 'The report of an actuary filed with the Commission ... shall be prepared using assumptions that are appropriate for the plan and methods consistent with the sound principles established by precedents or common usage within the actuarial profession ...'

In examining valuation reports, the Pension Commission judges assumptions by internal unpublished guidelines which are varied from time to time. Practicing consulting actuaries indicate that in August 1987 the maximum interest rate generally acceptable to the Pension Commission is 8% per annum and that this is acceptable only if linked with an 8% per annum salary increase assumption. An interest rate of 7% linked with a salary increase rate of 5-1/2% or over is likely to meet with the Commission's acceptance, while the use of 6% interest is likely to be accepted with little constraint on the salary scale.

Revenue Canada's restrictions on economic assumptions are published ((13), Sections 22 and 23):

> 'In cases of plans which provide for pension benefits on best or final average earnings at retirement, these benefits may be funded on the basis of anticipated increases in salaries which reflect promotional, productivity and economic increases, provided that the long term assumption adopted for the salary scale is reasonably consistent with the long term assumption concerning the rate of return on assets; normally, the long term assumption for the salary scale should not exceed the long term assumption for the rate of return on assets'.

Thus an interest rate/salary increase assumption of 7% / 6% may be acceptable to Revenue Canada, while 6% / 7% would usually be unacceptable. Further, for plans with provision for inflation-related supplements to pension levels,

> 'Supplementary pension benefits ... may be funded on the basis of anticipated long-term increases in the Consumer Price Index or the excess earnings, as the case may be, in future years in regard to active, retired and terminated members provided that the long-term assumption adopted for the funding of supplementary pension benefits is reasonably consistent with the long-term assumption concerning the rate of return on assets. Normally the latter should exceed the former by at least two percentage points'.

Thus an interest rate/salary increase/price inflation assumption of 7% / 6% / 4.5% may be acceptable to Revenue Canada while an assumption 7% / 6% / 5.5% would probably be unacceptable.

The constraints imposed by the Pension Commission and Revenue Canada are relatively tight. The interest rate/salary increase assumptions used by actuaries tend to fall within a fairly narrow range. After allowance for the degree of variation which can be expected in the risk level, investment return and salary increase performance of different employment pension plans, the extra variation caused by differences in actuaries' judgements is not large. In a 1983 survey of pension plans ((10), p. 39-40) 247 out of 264 plans surveyed nationwide were valued using an interest rate of between 5.0% and 7.9%. 119 out of 141 plans surveyed used an interest less salary increase gap of between 1.0% and 2.4%.

D Canadian Institute of Actuaries and Professional Standards

The Canadian Institute of Actuaries was incorporated March 18, 1965 by Act of the Parliament of Canada (16) as a successor to the Canadian Association of Actuaries. It has close relations with the Institute of Actuaries, London, founded 1848 and incorporated by royal charter 1884, and with the Society of Actuaries. The Society was established by the merger in 1949 of the American Institute of Actuaries, founded 1909, and the Actuarial Society of America, founded

1889. In June 1986 there were 1,305 Fellows of the Canadian Institute of Actuaries ((4), p. 7). Among the 'guiding principles' ((4), p. 4) of the Canadian Institute of Actuaries are that the Institute should dedicate itself to

> 'Serving the public by ensuring a high level of professional conduct of members and a firm and fair procedure for the discipline of members'.

and to

> 'Maintaining a high standard of qualification for its membership by ensuring
>
> (i) the quality of its requirements for admission
> (ii) the continuing education of actuaries after admission to membership'

Most trainee actuaries are university graduates in mathematics or statistics. In order to gain the designation 'Fellow, Canadian Institute of Actuaries', it is necessary to pass 10 professional examinations, study for which generally takes between five and ten years following graduation, and to satisfy a practical experience requirement.

The disciplinary procedures of the Canadian Institute of Actuaries are prescribed in some detail ((4), pp. 51-58). Failure to follow the provisions of the professional conduct documentation can result in disciplinary action. As of June 1, 1986, of the cases which had been considered by the disciplinary committees, seven concerned the quality of actuarial work or reports. Among the powers of the disciplinary committees is the ability to remove the right to use the FCIA designation.

Governments in Canada and elsewhere have generally decided that detailed legislation prescribing the assumptions and techniques to use in valuations is inappropriate in view of the individual variation between different cases and the need for assumptions to be kept up-to-date. In addition, there is little advantage in legislating for instance the interest rate assumption while leaving free the choice of an assumption such as resignation rates which varies greatly from employer to employer. In general, many would consider unnecessary regulation to be undesirable. Thus governments have relied on the judgement and professional integrity of actuaries and on self-regulation by actuarial organizations. Under the Canadian and British Insurance Companies Act, a life insurance company is to be valued annually by a Fellow of the Canadian Institute of Actuaries. Under the outgoing Ontario Regulation 746 (12), Section 1(b)) and the proposed regulation ((11), Section 1(d)), valuations of a defined benefit pension plan are to be made by a Fellow of the Canadian Institute of Actuaries. The actuarial profession has a good record of fulfilling the trust placed in it, as can be demonstrated by considering the history of the solvency of life insurance companies in Canada.

III EFFECT OF MANDATORY INDEXATION ON ASSUMPTIONS

A Effect on Individual Actuarial Judgement

Such a wide variety of factors influences the adoption of an assumption about an item such as the interest rate that the precise effect of one factor can be difficult to measure. However, it is fair to say that many but not all actuaries consciously make their assumptions more conservative than they otherwise would be because of a desire to see a plan's reserves build up to the point when an ad hoc increase to pensions in payment can be afforded by the employer. Effectively, extra conservatism may be built into the assumptions as a substitute for making an explicit assumption of future indexation. This extra conservatism would be likely to be discontinued if full or partial indexation of pensions were mandated and an explicit indexation assumption would be substituted. An informal survey of several consulting actuaries indicated that the following could be regarded as a very approximate consensus view of the interest rate assumption for a typical employment pension plan:

Realistic assumption:	8.0% p.a.
With conservatism to safeguard pensions:	7.5% p.a.
With additional conservatism to allow for ad hoc increases	7.0% p.a.

Thus my estimate on necessarily scanty data is that mandatory indexation at about 60% of the rate of inflation would lead to an average increase in the interest rate assumed of about 0.5% per annum, together with the addition of an explicit assumption about future indexation. Many plans would show no increase in the interest assumption, while for others the increase would be more than 0.5%. If the excess interest approach were used, then the explicit assumption about future indexation could result in the use of an interest rate equal to the guide rate.

Relatively standard techniques are available to determine the cost of pension indexation ((1), Chapter 6.5 and (14), Section 4.8), though the choice of assumptions is, as always, a matter of judgement. Use of the above assumptions, an assumed inflation rate of 4.5% per annum and the GAM 1971 mortality table gives the following results expressed relative to an arbitrary $1,000,000 per annum current service cost using 7.0% per annum interest and zero mandatory indexation, where it is assumed that the only benefit is a pension payable at age 65 to a male with a 60% survivor pension payable to his wife, assumed to be 3 years younger:

Interest/ Indexing Basis		Annual Current Service Cost
7.0% / 0.0%:	extra conservatism to allow ad hoc increases	$1,000,000
7.5% / 0.0%:	normal conservatism	963,887
7.5% / 4.5%:	allow for 60% x 4.5% mandatory indexation	1,215,340

Thus the perceived cost increase may be from $1,000,000 to $1,215,340 while the true cost increase due to the mandating of 60% indexation corresponds to the change from $963,887 to $1,215,340.

The use of less conservative assumptions after the mandating of indexation would soften the cost blow to the employer only slightly. One must expect that some and perhaps many employers, citing the need to be competitive with employers operating in other jurisdictions, will change to defined contribution plans or will reduce the benefit formula percentages in their pension plans so that the initial retirement age rate of pension payment is reduced. My opinion is that an indexed or partially indexed pension of lower initial amount is preferable to an unindexed pension of the same lump sum value because the true affordable living standard is more apparent.

B Possible Views of Canadian Institute of Actuaries

The mandatory indexation of pensions would not necessitate any major changes to the professional conduct documentation of the Canadian Institute of Actuaries. It is clear that the current documentation requires that where pension adjustments are required, for example under the plan document, then provision for the adjustments must be made by the actuary in performing the valuation. The Institute, however, could be expected to raise strong arguments against any imposition of a uniform set of assumptions for the valuation of a heterogeneous set of employment pension plans.

IV AMORTIZATION PERIOD OF COST INCREASES

A Current Practice

A benefit improvement resulting from an amendment to the plan document will generally lead to an increase in the accrued liability. Depending on the methods and assumptions used, even a benefit improvement affecting only benefits earned prospectively may lead to an increase in the accrued liability. An increase in accrued liability corresponds to a reduction in surplus or the creation of or an increase to the unfunded liability. If an unfunded liability exists, then a decision is required about the speed at which it will be amortized (see glossary); that is a decision is required about the level of funding. The Canadian Institute of Actuaries professional conduct documentation reads ((5), Section 4.02 (a))

> 'One of the fundamental purposes of funding is to provide security of benefits provided under the terms of the plan with respect to service that has already been rendered, without further recourse to the assets of the plan sponsor. In formulating his recommendations as to:
>
> . the choice of the actuarial method for funding and
>
> . the resulting level of funding,
>
> the actuary should bear this fundamental purpose in mind in the interests of all plan participants. This would normally entail projection of salaries through to retirement in the case of a final or best average pay plan and a projection of post-retirement adjustments in a plan which contains a specific provision for post-retirement adjustment of pension'.

An actuary will safeguard the security of benefits by recommending that the unfunded be paid off through deposit by the employer of a lump sum or by the making by the employer of a series of amortization payments. The actuary will require the period over which the amortization payments are made to be sufficiently short that benefit security is preserved. A commonly used criterion is that the amortization period should be no longer than the average future service up to retirement age of the employees whose benefits have been improved. Thus bankruptcy of the employer should not lead to the existence of benefits promised but not covered by plan assets. Another consideration is that unnecessary inter-generational transfers should be avoided, so an unfunded liability created to benefit a given generation of employees should be amortized while that generation represents the bulk of the workforce.

Under the outgoing Ontario Regulation 746, ((12), Section 2(3) (b) (ii)), an unfunded liability created by plan amendment is to be amortized by level payments not less frequently than annually made over a period not to exceed 15 years. The proposed new regulation ((11), Section 5) is generally similar in this respect, but the payments over 15 years are to be made monthly. A change under the new regulation is the requirement for amortization over 5 years or less of any solvency (wind-up basis) deficiency. In addition, in the proposed new regulation Section 5(4) (a) provides that as an alternative the employer may make amortization payments calculated as a constant percentage of payroll, but for the same 15 year period. The projected future payroll is required in finding the present (discounted) value of the amortization payments. Section 5(4) (c) requires that the projected future payroll be determined 'using the same actuarial assumptions as used in the going concern valuation'.

Revenue Canada Information Circular 72-13R7 is silent on the issue of the expression of amortization payments as level amounts or as a constant proportion of payroll.

As a result of this Ontario legislation, the near-universal current practice is to amortize the unfunded liability resulting from benefit improvements over a 15 year period. It should be noted, however, that any actuarial experience gains (e.g. due to better than assumed investment performance) are used to pay off all or a part of the unfunded liability if they arise within the 15 years. Thus few pension plan valuations today include a requirement to amortize plan improvements made 10 to 15 years ago, since some experience gains have usually occurred since the early 1970's.

B Amortization Period Under Mandatory Indexation

Under some cost methods, mandatory prospective indexation of pensions accrued after the date of legislation would lead to an increase in current service cost but no increase in accrued liability. Under other cost methods an increase in both current service cost and accrued liability would result. Certainly any voluntary or mandatory retrospective indexation of pensions earned prior to the date of legislation would result in a very significant increase in accrued liability under all cost methods. Under current legislation, one would expect the resulting unfunded liabilities to be amortized over a 15 year schedule.

If prospective indexation were mandated then for the majority of plans with a relatively standard age distribution an amortization period of 20 or even

25 years could be justified as being reasonable. Most of the retirement pensions of relatively young employees would be affected by prospective indexation, while a smaller proportion of the pension of older employees would be affected. Thus there is more time to amortize any unfunded liability. It should be noted however that in dollar terms the difference between 15 and 25 years amortization (as for a mortgage) is relatively small if the level payment method imposed by provincial legislation is used. Using an interest rate of 7% per annum one finds that $1,000,000 amortized by level payments at the start of each year requires $102,612 per annum for 15 years or $80,197 per annum for 25 years, a difference of $22,415 per annum. Regard the $1,000,000 as being the increase because of prospective indexation in the unfunded liability which results from application of the CICA preferred projected unit credit method. Then in a typical case, the $22,415 per annum 'saving' will be exceeded by a factor of 4 or more by the increased cost which would result from the addition of retroactive indexation to the prospective indexation.

If the final regulations allow for amortization as a constant percentage of payroll, then the effect of allowing a longer amortization period is slightly greater. One might assume 7% per annum interest, 6% per annum salary increases, a 3% per annum decrease in the number of employees, and a $1,000,000 per annum initial payroll. Then amortization of a $1,000,000 unfunded could be at a rate of 8.682% of payroll, with payments made at the start of each year for 15 years. Alternatively, the amortization could be at a rate of 6.194% of payroll for 25 years. Although this decrease from 8.682% to 6.194% is proportionally somewhat greater than the decrease from $102,612 to $80,197, any incentive effect of the prospect of 25 years amortization will be fairly weak. The incentive effect will be particularly weak when the employer considers the added period over which payments are to be made.

Thus any advantage to the employer of a longer amortization period is very marginal. It would be possible to offer employers a longer amortization period for mandatory prospective indexation provided that sufficient voluntary ad hoc retrospective indexation has been provided. However, the above numbers show that this would be unlikely to be an effective incentive to give ad hoc increases.

The amortization period for any unfunded liability resulting from increases to pensions earned prior to the date of legislation would have to be relatively short. In cases where there are many long service employees about to retire, even the 15 year period may be somewhat unsafe.

The possibility might be considered of allowing pay-as-you-go funding of the increase portion of indexed pensions. Though this would not be in accordance with safe funding practices, the financial shock to employers of mandatory indexation would be somewhat spread out in time. Pay-as-you-go funding of the 'escalated adjustment' portion of pensions is allowed under both the outgoing Ontario Regulation 746 ((12), Section 3) and the proposed new regulations ((11), Section 8). In practice, it has been usual for any ad hoc increase in pensions to be valued by the actuary in such a way as to produce an unfunded liability which is amortized over 15 years or less. Indeed, it is not uncommon for ad hoc increases to be funded by a single payment by the employer. Rapid funding appears to be a prudent course of action since it would be difficult to decrease pensions if funding proved inadequate. The pay-as-you-go cost of any mandated indexation would depend very much on the form of indexation. If only pensions earned after the date of the legislation are affected, and hence only those retiring after the date of the legislation receive any increases, then in the first few years the pay-as-you-go cost could be exceedingly small. However, on a proper funding basis an increase in current service cost of around 30% may occur. If proper funding is not used, then after a couple of decades the pay-as-you-go cost would rise dramatically, with possible repercussions on fund solvency. The possibility exists of for instance mandating that the proportion of the indexation increases which are to be funded in advance should rise from 0% to 100% over 20 years. This might result in a reasonable compromise between the acceptability of immediate cost increases and the security of the benefits. If such a policy were adopted, then under the projected unit credit method a plan where the accrued liability exactly equalled assets prior to the mandating of indexation would have an increase of liability. The amount of increase would depend on the age and service distribution of the employees and on the assumptions used. However, in some cases under prospective indexation an increase in accrued liability to 115% of assets might result while if retrospective indexation were also imposed an increase to 130% of assets might result. The increase in current service cost (normal cost) would be by the same proportions initially, but in the case of prospective indexation the level of 130% of previous current service cost would be reached as those with retrospective portions to their pensions reached retirement age. If pay-as-you-go funding were allowed then the pay-as-you-go payments would initially be small compared with the true cost increase. The resulting deficit would add to the amount to be funded by the time of mandated 100% funding, so the latter years of the 0% - 100% scale could be relatively difficult. Detailed consideration of the cost incidence under such a scenario is outside the scope of this paper on actuarial assumptions. However, if a pay-as-you-go policy is considered for implementation then computer simulations of the cost incidence would be worthy of incorporation in the indexation costing being performed for the Task Force.

Pay-as-you-go funding of the increase portion of indexed pensions is unlikely to meet with any objection from Revenue Canada ((7), p. 73 and (13)). However, the portion of the professional conduct documentation of the Canadian Institute of Actuarians which reads ((5), Section 4.02 (a))

> '...normally entail ... projection of post-retirement adjustments to a plan which contains a specific provision for post-retirement adjustment of pension'.

would probably result in most actuaries being unwilling to certify as 'consistent with the sound principles' the pay-as-you-go funding method for the increase portion of indexed pensions. Then ((5), Opinion C1A-4) the actuary would be guided by the requirement

> 'If, nevertheless, a client or employer requests the member to prepare a study which in his opinion deviates from this practice, any resulting report, communication or certificate submitted by him will include an appropriate and explicit qualification of his findings'.

Thus the actuary would be likely to sign a qualified valuation report.

In summary, the regulations with respect to the amortization period could specify level dollar payments, level percent of payroll payments, both or neither. Also the regulations could permit indexation adjustments to be funded more slowly. I would support the present level dollar method and I would favour the present 15 year amortization period for all benefits in view of the greater security of employee's benefits under the present legislation. However, there may be an argument that a somewhat insecure escalated portion of a pension is better than no escalated portion at all.

V CONCLUDING COMMENTS

It must be emphasised that the choice of actuarial methods and assumptions does not affect the cost of a pension plan, but only the incidence in time of the contributions to the plan. At one extreme, an employer could set up a pension plan for current employees and (if the money were available) make a single lump sum payment estimated to be sufficient to pay for all pensions to be paid from the plan in the future. At the other extreme, an employment pension plan in the absence of provincial legislation could be established without provision for a fund of assets. Then all pensions and other benefits would be paid directly from the contributions made during the month when the benefit was paid; this is known as the pay-as-you-go method.

The actuarial valuation arranges the pre-funding of benefit obligations and the build-up of a fund of assets at a rate which depends on the methods and assumptions employed. However the assets 'don't know what the interest assumption is' and the employees probably 'don't know what the resignation rate assumption is' so the actual cost of the plan does not depend on the actuary's work. To some small extent, the use of conservative assumptions may increase the plan's true long-term cost because the build up of surplus encourages the granting of ad hoc pension increases.

Incentive to provide retrospective indexation which result in a true change in economic cost would be the most effective. If subsidy from provincial tax revenues is ruled out, then manipulation of plan and indexation provisions is required. An example would be the mandating of escalation of prospective pensions at 75% of the Consumer Price Index, with the alternative of 45% indexing of both prospective and retrospective pensions. Another example would be permitting employers to offer the alternative of the unindexed retrospective benefit or a retrospective benefit starting at 80% of its defined level but indexed at 60% of the Consumer Price Index.

Indexation is socially desirable but expensive. Variations in actuarial assumptions can only affect the incidence in time of the additional costs, not their true amount.

VI GLOSSARY

Accrued Liability:	The value, discounted for future interest, of benefits earned (accrued) to date under the plan. This amount is estimated by the actuary.
Amortization:	Paying off a debt by making a series of payments. A house mortgage is a good example.
Annuity:	Series of payments made periodically (often monthly). A pension annuity may cease at death or continue, perhaps at a lower rate, to the pensioner's spouse.
Current Service Cost:	The annual amount which represents the cost of benefits earned (accrued) during the year.
Defined Benefit Pension Plan:	A plan under which the benefits on retirement, termination, etc. are defined in the plan document through use of a formula which may be related to salary, years of service, etc.. An example of a defined benefit plan is one in which the retirement benefit is an annual pension of 1-1/2% of final salary for each year of service.
Defined Contribution Pension Plan:	A plan under which benefits are a function of the contributions attributable to the individual and accumulated at a rate generally equal to the rate of return on the assets of the plan. A typical retirement benefit for a plan with 100% matching employer contributions would be the pension which can be purchased as an insurance company annuity with a lump sum equal to double the employee's accumulated contributions. The term 'Money Purchase' is often used to describe this type of plan.

Integrated Plan:	A plan where benefits and contributions are designed with a view to the total after consideration of the Canada Pension Plan (rarely Old Age Security). For instance, employee contributions might be 5% of earnings less CPP contributions, and the benefit may be 2% of final salary per year of service, reduced by the amount of CPP benefit assigned to that year of service.
Surplus:	The excess, if any, of (the actuarial value of) the assets over (the actuary's estimate of) the accrued liability. A negative surplus is called an **unfunded liability**. To the extent that the estimates are proven by future events to be accurate, the surplus is an indication of the excess of the assets over those required to pay for benefits already earned and promised.
Unfunded Liability:	A negative **surplus**. An unfunded liability occurs when the actuary's estimate of the value of benefits earned exceeds the value placed on the assets.

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Financial Accounting Standards And The Indexing of Pensions

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Financial Accounting Standards And The Indexing of Pensions

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ABSTRACT

This paper was written to describe the financial statement impact of legislation designed to provide inflation protection for employment pension plans. The paper begins with an historical overview of pension accounting in Canada and then considers, in some detail, the recently revised accounting standard for pension costs and obligations contained in Section 3460 of the CICA Handbook.

Following this background discussion, the paper investigates the financial statement impact of legislation on both a prospective and retroactive basis. The analysis reveals that no matter what form the legislation takes, there will be an increase in the pension expense. If the legislation is retroactive there will also be an increase in the pension obligation which is disclosed in the notes. The primary conclusion is that the accounting profession will be able to reflect the economic impact of the legislation without difficulty. The capital market reaction to these changes are also briefly considered, with the conclusion that the markets will adjust to reflect the impact of the legislation.

I INTRODUCTION

The purpose of this document is to investigate the impact on the financial statements, including notes, of Canadian companies that would be brought about by proposed legislation requiring inflation protection for employee pension plans. Therefore, it will be necessary to thoroughly analyze the financial statement outcomes brought about by applying the recently changed Canadian Institute of Chartered Accountants' (CICA) Handbook Section 3460 and the new Financial Accounting Standards Board's (FASB) SFAS No. 87, to the most likely legislative alternatives currently under consideration.

II NECESSARY BACKGROUND CONSIDERATIONS

A Overview of Recent Pension Accounting Events

Only recently has accounting wrestled with the complex problem of how to report the reality of corporate pension promises in the financial statements. There was a flurry of activity in the mid-60s during which Coutts and Dale-Harris [1963] produced an insightful research study for the CICA and Hicks [1965] generated an accounting research study for the American Institute of Certified Public Accountants. Recent interest, no doubt generated by the magnitude of corporate pension assets and obligations and the acknowledged deficiencies in the existing financial reporting standards, brought forth intense analytical research efforts over the last decade (eg. Skinner [1980] and Archibald [1980]).

This research work, and the subsequent analysis and debate it created, has resulted in what can only be described as crucial accounting decision making by the legally empowered accounting standard setters: the CICA in Canada with the substantially revised Handbook Section 3460 (effective for fiscal years beginning on or after December 1, 1986) and the FASB in the U.S. with SFAS No. 87 (effective for fiscal years beginning after December 15, 1986).

B Accountants and Actuaries Play Different Roles

At the outset, it is vital to clearly distinguish between the role of accountants and the role of actuaries. The roles are significantly different and an appreciation of the differences is vital to an understanding of pension accounting procedures and problems.

The following quote, [Archibald, 1982, p. 27] captures the actuarial task:

> 'The essential role of the pension actuary is to advise plan sponsors about the funding payments required to provide for the pension benefits promised to their employees. In carrying out this role, the actuary assembles and analyzes employee and other data, performs appropriate calculations and reports on the assets and liabilities and the future contributions necessary to fund the pension plan.
>
> Thus, the actuary renders the advice which will enable the pension plan sponsor to accumulate sufficient funds over the working years to provide the pension benefits promised to an employee in his retirement years.'

Thus, the actuary must consider the cash flow needs of the client, the particular terms of the pension plan, any additional government legislation (ie. indexing requirement) and any tax related rules. In doing so, the actuary incorporates various estimates as to future events and as to the demographics of the plan beneficiaries. The goal is that of cash flow determination and advice which does not necessarily reflect, and may have no relation to, the pension benefits earned by the employee group during the particular accounting period.

The accountant is concerned about the measurement of any assets and liabilities that a company may have regarding the pension promises that it has made, and communicating these data to financial statement readers in a manner that is comprehensible and decision-useful. Another critical role of the accountant is to allocate the cost of meeting the pension promise over the working careers of the employees in some systematic and rational manner.

C An Historical Perspective

The pension practices that developed to account for the large-scale introduction of pension plans subsequent to World War II often followed a pay-as-you-go pattern which, in effect, left pensioners on the payroll, or a terminal funding pattern in which a lump sum was either paid to a financial institution or deposited in the corporate plan when the employee retired. Both of the methods violated the crucial matching principle because the services from the workers were received prior to retirement and the costs to the company were reflected subsequent to retirement. In other words, these methods did not allocate the cost of providing pensions over the employee's working years in a systematic and rational manner.

Clearly, there was an improvement to this unacceptable situation when the accounting ground rules were established to reflect pension expense based on the actuarial funding payments.

Since at least the issue of CICA Bulletin No. 21 in 1965 until the current time, the vast majority of corporations reflected, in their accounts as costs, the funding payments into the pension fund as recommended by the actuary. Few problems were perceived. In most circumstances, the payments made into the pension fund were reflected as expense. The tax department accepted the actuarial certificate and considered such payments as an expense for tax purposes. Accountants ignored any existing obligation because they were assured that under the guidance of the actuary, just like the Canada Pension Plan, the obligations would eventually be funded.

Another fundamental principle of accounting is that it is performed in the context of a going concern, a corporate entity that is expected to continue in existence indefinitely. Until the new accounting ground rules were developed, this fact seemed to be largely ignored in the accounting standards. Corporate obligations for their pension promises were strangely absent from common accounting reporting practice, and there was no accounting requirement that salary projection be considered for career average or final pay plans.

D Recent Changes to Pension Accounting Standards

Obviously, under the old ground rules where accounting directly followed the actuarial advice, any family of actuarial methods or variations thereon was acceptable for accounting purposes. This will no longer be permissible for accounting purposes.

The basic provisions of the revised Handbook Section 3460 that are relevant to this analysis are as follows:

1. 'In accounting for the cost of pension benefits, the terms and conditions of the plan determine factors to be considered for measuring the pension costs and obligations.' (3460.04) This would presumably include any legislation that would mandate some type of inflation protection for benefits.

2. There is a single method (specifically, the projected benefit method pro-rated on services), for accounting purposes. (The method can be described as an accrued benefit or unit credit method, with salary projection, allocated on a years-of-service basis [ABVM/K$B (Archibald, 1980)].

3. Most amortizations of pension plans are allocated and charged to expense over the estimated average service life of the existing employee group (commonly 13 or 14 years).

4. A 'best estimate' approach is required [see Ezra, 1982, pp. 38-39]. Deviations from best estimates (experience gains and losses) and revisions to best estimates (changes in actuarial assumptions) are normally charged to expense over the estimated average remaining service life of the existing employee group.

5. The actuarial present value of pension benefits and the market-related value of pension funds assets are disclosed in footnote format.

6. An asset or liability amount will only appear on the balance sheet if the amount of the accounting expense varies from that which is funded.

From an accounting perspective, it is vital to recognize that the existing accrual accounting model does not necessarily follow the pension plan funding patterns resulting from actuarial analysis and advice. Succinctly, accounting does not equal funding. (In light of the new Handbook Section 3460, the intersection may result in a null set.) Actuaries are concerned with providing funding advice to their corporate clients while accountants follow the system of accrual accounting, which is specifically designed to transcend immediate cash flow patterns, in order to properly measure both income and financial position.

One clear rationale for the CICA in requiring a single accounting method is that there was no persuasive evidence that, in a single country with a national economy, there were any differences between companies with respect to their basic pension obligations. Following extended research, analysis and debate, the CICA settled on one specific actuarial method for accounting purposes.

Unquestionably, those firms that are using a method other than the projected benefit method prorated on services, will be forced by the new ground rules to change their methods for accounting purposes. Even those firms that are following the newly required method will have to change from their current, presumably more conservative, actuarial estimates to 'best estimates'. Thus, there will be a great upheaval in those companies with fiscal year beginnings on or after December 1, 1986. However, once these carefully thought out 'best estimate' changes are in place, all subsequent accounting changes will be suitably scrutinized in a very careful manner.

E Best Estimates a la Ezra

In his recent study, Don Ezra [1983] used the phrase 'best estimates'. Direct reference to the actual document is, of course, necessary for comprehensive understanding but, in summary, Ezra recognized that actuaries are extremely conservative; so conservative that their calculations for the development of funding advice were too pessimistic, even for accountants to use in their work. The essence of Ezra's term 'best estimates' is that in developing a more realistic set of actuarial quantities, the actuaries should use estimates that best reflect their view of the long run parameters that predicate the pension quantities. This means actuaries should not artificially build in extra cushions. If an actuary believes that the long run inflation rate in an economy is going to be 4%, he should not artificially use 3% because it results in a more conservative obligation number.

The revised Handbook Section 3460 requires that management select best estimates for determination of the pension obligation. This essentially moves the accountants and auditors, who previously accepted at face value the actuarial estimates, into a new world of management determined estimates for financial reporting purposes. In effect, the former actuarial estimates built into the determination of pension quantities must change, only for accounting purposes, because they have now become management's 'best estimates' for their financial reporting stewardship function. This means that these estimates should reflect the best possible estimates of the future economic conditions and, furthermore, any change in these estimates must follow some carefully considered accounting requirements for the proper reflection of changes in accounting estimates.

F Disclosure of Pension Plan Surpluses and Deficits

As previously observed, the revised accounting standard requires that companies sponsoring defined benefit pension plans provide note disclosure of the following:

1. Market (or market-related) value of the assets in the pension plan.
2. The actuarial present value of the pension obligation using the accrued benefit valuation method, with salary projection, prorated on service.

From these figures, a financial statement user would be able to determine if the pension plan is in a net surplus (asset) position or a net deficit (liability) position. However, it is important to realize that these figures are not recognized on the face of the financial statement, but rather are included in the notes to the financial statement. The only way a pension asset (deferred charge using the Handbook terminology) or a pension liability will appear on the face of the financial statements is when there is a cumulative difference between the amount of funding to the pension plan and the amount of pension expense recorded using the revised section of the Handbook. For example, if the cumulative pension expense since the adoption of the new section was $7,000,000 and the cumulative funding over the same time period was $5,500,000, then the company would show a pension liability on the balance sheet of $1,500,000. Technically, this figure does not have to be disclosed separately on the face of the statements or in the notes. It is also true that this type of pension liability could be present even if the pension plan was in a net surplus position.

G Defined Contribution Pension Plans

Accounting for a defined contribution plan is straightforward relative to a defined benefit plan. Generally, the expense to be reported by a corporation that has a defined contribution plan is the amount that the contract requires it to contribute. For example, if the contract between the corporation and the employees calls for a contribution of six percent of salary, then the accounting expense will be six percent of total salary. If, for some reason, the corporation pays less than this figure, the shortfall will result in an accounting liability equal to the difference between the expense and the amount funded. If, at the time a defined contribution pension plan is introduced or liberalized, the employer assumes an obligation for past service costs, this unpaid amount will be amortized to income over the average remaining employee service life with the unamortized amount disclosed in the notes.

H Role of the Auditor

The role of the auditor in the area of pensions is no different than in any other area of the financial statements. Specifically, the auditor's role is to ensure that the financial statements, which are management's representation, present fairly in accordance with generally accepted accounting principles. In the area of pension assets this means that the auditor must acquire sufficient audit evidence to assure himself that the assets: 1) exist, 2) are complete, 3) are owned by the pension plan, and 4) are valued at market or market-related value on a basis consistent with the prior year. The determination of the actuarial obligation for accounting purposes is a much more subjective task because the calculation is based on a considerable number of future estimates. The CICA Handbook requires that these estimates be management's 'best estimates' and, therefore, are likely to be less conservative than those used by actuaries for funding purposes [Ezra, 1983].

An understanding of the nature of an auditor's procedures in the area of 'best estimates' can be derived from the audit guideline 'Audit of Pension Costs and Obligations':

> 'Actuarial assumptions relate to such matters as mortality, withdrawal, disability, retirement, changes in compensation, expenses, interest on accrued pension benefits, investment earnings, and asset appreciation or depreciation. Section 3460 requires the use of best estimate assumptions and defines best estimate assumptions as a set of actuarial assumptions each of which reflects management's judgment of the most likely set of conditions affecting future events.
>
> Auditors would therefore consider applying the following procedures to determine whether the assumptions appear reasonable and reflect the most likely set of conditions affecting future events:
>
> (a) review the process and criteria used in developing the assumptions considered by management to be the most likely set of conditions affecting future events;
>
> (b) review the internal consistency of the assumptions and their consistency with other publicly available long-term forecasts of economic conditions;
>
> (c) compare the assumptions with publicly available assumptions of other sponsors; and
>
> (d) discuss the reasonableness of the assumptions with both management and the actuary.
>
> In the years following implementation of the new pension disclosure requirements, comparisons with assumptions of prior years may also be useful.' (paragraphs 20-22)

Perhaps the key conclusion from the above is that the auditor's objective is to determine if the assumptions are reasonable. While the auditor may have chosen slightly different estimates if they were responsible for the choice, their role is limited to assuring themselves that the actuarial assumptions are internally consistent and reasonable.

III LEGISLATIVE IMPLICATIONS

To reiterate, the goal of this document is to analyze, in advance, the impact on corporations' financial statements of certain legislative alternatives to bring about inflation protection. As the legislative task force contemplates an array of proposals for the best manner in which to introduce inflation protection, it is truly vital to consider the impact of the various options on the financial statements of those companies that must abide by the laws.

A Nature of the Legislation

The provisions of the legislation will dictate the accounting outcome; not visa-versa. The accountants will wait for the exact legislation, translate its economic implications, through a change in 'best estimates', into the revised accounting expense and obligation amounts, and report them in the specified manner.

One of the critical provisions of the legislation will be whether mandatory indexation will be introduced on a prospective or retroactive basis. Under a strict prospective method employees would earn retirement benefits that are indexed from the effective date of the legislation onward. Any retirement benefits earned up to the effective date of the legislation would not have any built-in protection for inflation. Retirees would likewise receive no benefits. Under a retroactive method, employees would have some degree of inflation protection for retirement benefits that they have already earned up to the effective date, as well as inflation protection for retirement benefits earned subsequently. The distinction between these two methods is far from trivial because it has a considerable economic impact as well as a political implication as to perceived fairness. The tradition in granting pension benefits has been to provide some degree of past service credit so as to treat all employee groups in an evenhanded manner.

The discussion that follows will first consider the impact on corporate financial statements if legislation is introduced on a prospective basis because the outcomes are relatively clear and more easily analyzed and presented. The discussion will then shift to retroactive application which can be highly complex. The retroactive approach raises numerous problematical issues which require considerable analysis and discussion to arrive at appropriate conclusions.

B Prospective Legislation

Under a prospective method there would be no immediate change to the actuarial obligation disclosed in the notes. The reason is that the obligation disclosed in the notes using the Handbook method is based on the retirement benefits earned to that point in time. That is, the obligation is the actuarial present value of future pension plan payments based on service rendered to the year-end. The obligation will already incorporate future salary projection, but without adjustment for inflation subsequent to retirement (unless it is already built into the pension contract). As the prospective method would not change the cash outflows for these previously earned retirement benefits there is no need to change the obligation.

The impact of the legislation would be from the effective date of the legislation onward. There would be an increase in the current service cost component of the accounting expense as the employees are now earning, for each year of service, an indexed pension promise. Clearly, if the company does not increase funding in line with the increased pension expense the accountant will record, on the balance sheet, a liability for the difference.

C Retroactive Legislation

The key question, appropriately posed, is as follows; is there an accounting problem in introducing inflation protection on a retroactive basis?

Naturally the answer will be predicated on the specifics of the pension legislation. If, however, the most likely event is something like an indexation on some retroactive basis for active and retired employees that is calculated at, say, sixty per cent of the change in some consumer price index, the short answer is that there is not an accounting problem. The accounting is very clear on the question. As it now stands, given the particular pension promises of any pension plan, say a final highest salary plan at 2% per year of service, a clear pension obligation develops for the corporation and is calculated using 'best estimates'.

The reason we maintain that there is no accounting problem follows the reality that any retroactive indexation provision does nothing more than increase the outstanding obligation which must be amortized over the expected average service life of the remaining employees. This is simply the addition of a new accounting estimate (technically, a change in an accounting estimate) to the host of 'best estimates' that already exist. The reason for this conclusion is that prior to the introduction of the legislation, the accounting estimate was that, unless specifically stated otherwise, there would be a zero per cent increase in ultimate benefits subsequent to retirement. The legislation simply changes this assumption to be sixty per cent of the inflation rate subsequent to retirement. The net effect will normally be to increase the obligation and therefore the expense will increase by some amount.

B An Example Of The Impact On Financial Statements

With the introduction of retroactive indexing of pension benefits, three components of the accountant's expense calculation will be directly impacted. First, the amount of the accrued pension benefit will be increased as the ultimate amount of pension benefit to be paid out in the future for the benefits previously earned will increase. The dollar value of this increase will be divided by the average remaining service life of the employee group under the plan to determine the yearly amortization. For example, if the accrued pension benefit of a pension plan (using the Handbook method) was $80 million prior to the legislation and then, due to the inflation protection legislation, increased to $88 million, the $8 million increase would be allocated as a cost over future years. If the average employee service life was computed as 16 years, the result would be a yearly increase in pension expense of $500,000 for a sixteen year period.

The second direct impact on the expense figure would be due to an increase in interest on the larger obligation. If, for example, the accrued pension benefit was calculated using an eight percent discount rate, then the pension expense would increase by an additional $640,000 ($8,000,000 x 8%).

The third component of pension expense that will be directly impacted is the accrual for the current year's service. As noted previously, this would be the only component of the expense that would change if the legislation were enacted prospectively.

While the pension expense will clearly increase, and presumably the funding payment as well, it is likely that the most significant change in the short term will be in the area of footnote disclosure. In the year of the introduction of the new legislation, the actuarial present value of accrued pension benefits will increase, but the assets in the plan will hardly grow proportionately because the increase in the obligation will be funded over several years. The combined impact would be to reduce an existing net pension asset or increase a net pension obligation. Although this change does not appear on the face of a Canadian company's balance sheet, it is possible that financial statement users will adjust the financial statements themselves to incorporate this particular item in some forms of financial analysis. In economic terms, they should! The economic obligation and related pension expenses have increased.

E Perception Of A Problem

There is no question that here will be a perception of a problem if people are concerned that the obligation increases and the expense to charge for the increased obligation will also be greater. However, this is the necessary outcome of any retroactive legislation. If a corporation has chosen not to provide inflation protection, and government legislation requires it to do so, the net results are:

1. real obligations have increased, and
2. the expenditures to fulfill those obligations will have to be increased.

Accounting can do no more or no less than reflect the underlying economic realities of the circumstances.

F Financial Market Perception And Reaction

Available evidence suggests that the financial markets are more than capable of adjusting for pension costs and obligations. Until recently, the real impediment has been the lack of disclosure of key pension quantities to permit markets to adjust appropriately. This deficiency has been largely eliminated in the United States. Canada's minimal disclosure requirements may serve to mask underlying economic realities but key data are mandated and actual practice may reveal substantially more.

The overwhelming evidence from decades of capital markets studies demonstrates that if disclosure is made, the market will adjust appropriately. For over a decade the securities rating services in the U.S. have been factoring in off balance sheet obligations (Regan, 1979).

If inflation protection is mandated in Ontario it will:

1. increase the obligation;
2. increase the expenses to service the obligation; and
3. reduce the market value of the affected companies (to the extent market anticipation of the legislation or previous ad hoc patterns had not previously adjusted values).

Such legislation creates an economic effect.The best of our theory and empirical studies predict the markets will appropriately reflect the underlying economics.

Because the increase in the obligation due to retroactive legislation is initially disclosed in the notes, the real economic changes are unlikely to affect the balance sheet and, therefore, traditional financial ratios. However, we believe that there will still be financial markets effects because the market is driven by the underlying economic balance sheet [Bagehot, 1972], which will change.

G Most Likely Outcome Of The Accounting Standard Changes

We are now gathering empirical evidence to confront the current general belief that the accounting standard changes will serve to generate a surplus of pension assets over pension obligations for a large number of Canadian companies. First, because of extraordinary securities market performance over the past 2 to 3 years, pension plan assets have likely increased in value. Secondly, most informed observers believe that the 'best estimate' approach required by Handbook Section 3460 will result in less conservative and therefore lower pension obligations. Certainly Ezra's (1983) data are consistent with this belief.

Although the available data are sparse, the Financial Executive Institute Survey of Pension Plans No. 6 (1983), based primarily on 1982 year ends, revealed that of its 343 reported pension plans, 42% were funded using the projected method (the method underlying Handbook Section 3460) and another 25% were using the even more conservative level contribution methods which also require projection. This suggests that the majority of these firms were previously in a position to be at least as strongly funded as contemplated by the CICA method and would fully reap the benefits of good markets and 'best estimates'.

These combined beliefs and data suggest that now may be the ideal time, in a political sense, to introduce pension protection legislation because the resultant increase in obligations may at least be partially absorbed by many Canadian companies because of existing, and in some cases massive, pension surpluses.

Another important observation follows the mandated shift to the less conservative 'best estimates'. Even with a true obligation increase resulting from required inflation protection, the net outcome, in the final confluence of factors, may be lower pension obligations and expenses reported by Canadian companies. This will depend on the degree of conservatism built in by the company's actuary.

Under final pay plans the active employees are effectively protected against inflation up until the time of retirement. The legislative effect on these plans as reflected in the accounts are unlikely to be large. One actuarial estimate suggests an approximation of a fifteen per cent increase in the obligation.

IV GENERAL CONCERNS

The following discussion is generally applicable whether indexation is introduced on a prospective or retroactive basis. Where there are differences, they will be specifically noted.

A Ad Hoc vs. Mandated Inflation Protection

Accounting does not function properly unless it reflects the underlying economics of a company's particular circumstances. The question has been raised about the difference between a corporation that follows a consistent pattern of indexing its retirees on an ad hoc vs. an explicitly contracted basis. In our view, albeit from an academic venue, the ad hoc pattern is a reflection of the economic reality of that company. Although an adamant client could raise the legal reality that until a concession has been granted to increase the pension there is no obligation, we would hope that a diligent public accountant would argue that this does not reflect the reality of the corporation's actions to financial statement readers, and that such a pattern of concessions should be built into the calculation of the true pension obligation and subsequent expense.

We contend then that such ad hoc arrangements should already be built into existing pension quantities, however, specific legislation currently being contemplated, whereby inflation protection is mandated by the law, merely removes the uncertainties and in fact demands that such economic realities be built into the accounts, whatever the cost.

B Implications Of Mandated Inflation Protection

Actuaries may wish to adjust for indexation by lowering the rate at which the pension benefits are discounted. While this may accomplish the objective of ensuring that increased funding is forthcoming, there are potential dangers. First, the lowering of the discount rate does not necessarily reflect best estimates.

As some companies (those filling with the SEC) will be required to disclose the weighted-average discount rate, there is a real danger that financial statement readers will be misled. This may also be true for those Canadian companies that voluntarily choose to disclose certain actuarial estimates. The critical point is that the audience that will be reviewing and evaluating actuarial assumptions has expanded.

C Career Average And Flat Benefit Plans

Not all pension plans are based on final average salaries which largely protect for inflation until retirement. The CICA viewed career average as something like 'final 40' plans and required projection, a feature contrary to standard actuarial practice. As has been stated so often in this paper, the ultimate effect of any form of inflation protection is to increase the eventual benefit. An inflation protection requirement undoubtedly makes projection more difficult, given the potential vagaries of post-employment inflation, but nevertheless estimates must and will be made.

Best estimates must also be made for flat benefit plans. The outcomes are merely accounted for in the customary manner: if the legislation is prospective we will have larger expenses and if it is retroactive we will have larger obligations and larger expenses. However, for flat benefit plans, mandatory inflation protection will relieve the auditor of the anxiety of arguing that the past pattern of ad hoc increases calls for increased obligations and expenses.

D Means Of Implementation

Up to this point, we have assumed that inflation protection will be implemented by requiring that payments to retired employees under a defined benefit pension plan will be related to some commonly accepted measure of inflation. The actuary will advise management on how much will have to be funded each year to meet this increase in the pension benefit promise and the accountant will note a larger obligation and record a larger expense.

Another means of implementing inflation protection is a pay-as-you-go approach. Under such a policy, a company would only fund the inflation component of the pension when it is actually paid to retired employees. This would clearly change the timing of the cash flows to the company by moving them to later periods. However, in theory, it will not change the economics, the yearly accounting expense, or the computation of the obligation disclosed in the notes. The reason, as previously emphasized, is that the accounting numbers do not equal the funding numbers, and under the revised Section 3460 the accounting quantities will be determined on 'best estimates', independently of funding. Therefore, if companies did follow a pay-as-you-go funding policy, we would expect the accountants' pension expense to be greater than the amount funded. This would lead to a balance sheet liability for the difference that would grow in size for a considerable period of time, until total funding began to exceed the expense figure.

A third means of implementing inflation protection is termed the excess earnings approach. Under this approach, earnings of the pension plan in excess of some pre-established arbitrary floor are used to fund a cost-of-living adjustment.

If the excess earnings approach is adopted, it is again stated that there is not an accounting problem. Such a scheme would merely change the assumed rate of return to be earned by the pension plan in the interests of the employer; presumably lowering it. This would therefore increase the actuarial obligation disclosed in the notes and the accounting expense. The increase in the obligation may well occur even if the legislation is introduced on a prospective basis, as the corporation will no longer benefit from the return in excess of the floor. The economic reality is that the legislation has reduced the value of the assets to the corporation. However, it is likely that this will be reflected by increasing the obligation as the assets must be disclosed at market-related value.

It is clear that if some built-in floor is incorporated into the excess earnings method, the corporation has an exposure to underwriting risk if the plan earns a return lower than the floor. The company must make up any deficiency. As Pesando (1983) describes, this will motivate corporate management to invest in low risk assets providing a return only marginally above the floor. The reasoning is simple; management gains no benefit from the higher expected return associated with the added risk because the entire excess is passed on to the employees. However, management is exposed on the downside because they must contribute to eliminate earnings short-falls. The logical behaviour is to redeploy the pension funds into lower risk assets. Thus, while there clearly are crucial economic policy issues involved in such an approach, the accountants will have no problems recording the outcomes.

V THE FASB POSITION

A General Overview

While not identical to CICA Handbook Section 3460, the FASB, in SFAS No. 87, generated an accounting standard that is quite similar to the Canadian position. Both require the use of the benefit formula contained in the pension plan itself (SFAS No. 87, p.14 and CICA Handbook Section 3460.04),and both require the use of the accrued benefit method, with salary projection, pro-rated on service (ABVM/K$B) for the determination of the current service expense figure and for disclosure of the obligation in the notes.

A primary difference is the requirement in the U.S. to establish a balance sheet obligation for a minimum liability if the accumulated benefit (ABVM, without salary projection) is greater than the assets in the plan. It is in this area that the legislation to index may have some more immediate impact on financial statement note and balance sheet disclosure of Canadian companies registered with the SEC. In describing the basis of calculating the accumulated benefit the FASB states:

> 'Automatic benefit increases specified by the plan (for example, automatic cost-of-living increases) that are expected to occur shall be included in measurements of the projected, accumulated, and vested benefit obligations, and the service cost component required by the Statement.'
>
> SFAS No.87, P.48

If automatic benefit increases specified by the plan must be included in the calculation of the accumulated liability, it would appear that any legislated indexation will form part of the accumulated liability as well. The impact would be to increase the size of the accumulated liability, therefore increasing the probability of the requirement to record the minimum liability on the balance sheet.

B Required Disclosure

Another important difference between Canadian and U.S. pension accounting standards related to the level of disclosure required. As has been mentioned, Section 3460 only required disclosure of the market-related values of the assets in the plan and the actuarial obligation. While other data may be provided, it is not mandatory.

The U.S. accounting standard sensibly requires considerably more disclosure which can best be summarized by quoting paragraph 54 of SFAS No. 87:

> '54. An employer sponsoring a defined benefit pension plan shall disclose the following:
>
> a. A description of the plan including employee groups covered, type of benefit formula, funding policy, types of assets held and significant nonbenefit liabilities, if any, and the nature and effect of significant matters affecting comparability of information for all periods presented.
>
> b. The amount of net periodic pension cost for the period showing separately the service cost component, the interest cost component, the actual return on assets for the period, and the net total of other components.
>
> c. A schedule reconciling the funded status of the plan with amounts reported in the employer's statement of financial position, showing separately:
>
> 1. The fair value of plan assets
> 2. The projected benefit obligation identifying the accumulated benefit obligation and the vested benefit obligation
> 3. The amount of unrecognized prior service cost
> 4. The amount of unrecognized net gain or loss (including market-related value)
> 5. The amount of any remaining unrecognized net obligation or net asset existing at the date of initial application of this Statement
> 6. The amount of any additional liability recognized pursuant to paragraph 36

7. The amount of net pension asset or liability recognized in the statement of financial position pursuant to paragraphs 35 and 36 (which is the net result of combining the preceding six items)

d. The weighted-average assumed discount rate and rate of compensation increase (if applicable) used to measure the projected benefit obligation and the weighted-average expected long-term rate of return on plan assets

e. If applicable, the amounts and types of securities of the employer and related parties included in plan assets, and the approximate amount of annual benefits of employees and retirees covered by annuity contracts issued by the employer and related parties. Also, if applicable, the alternative amortization methods used pursuant to paragraphs 26 and 33, and the existence and nature of the committment discussed in paragraph 41.'

VI CONCLUSION

At the outset, we noted that the purpose of this document is to investigate the impact on the financial statements, including notes, of Canadian companies that would be brought about by proposed legislation requiring inflation protection for employee pension plans. We conclude here that accountants will have no problems in dealing with the legislation. Clearly, the pension obligation will increase with the effect of decreasing a net pension asset (surplus) or increasing an existing net pension liability. However, this is the obvious intent of the legislation.

Someone has to pay the extra cost and, initially at least, the shareholders are likely to suffer a wealth decrease. Conceivably, the costs will later be passed on to customers through higher prices.

There is no end to speculations about the implications of the legislation. Small companies may go under, some may cancel plans and others may change to defined contribution plans. However, the accounting profession will have no problem in reflecting the increased pension obligations and the attendant costs.

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Income Taxation And Retirement Saving

Robert Couzin

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Income Taxation and Retirement Saving

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I INTRODUCTION

The Canadian income tax system recognizes and, indirectly, regulates pensions and other forms of retirement saving. Essentially, this is accomplished through a congeries of rules which provide limited tax assistance through deferral. Income which would otherwise be subject to immediate taxation may, in certain cases, be set aside to provide retirement security.

The purpose of this paper is to summarize the federal income tax law relating to pensions and retirement savings, and indicate the relevance of these rules to inflation protection. The discussion is non-technical, and is intended to convey the essential policy of the system as evidenced in the statutory enactments.

II TAX POLICY

To the extent that it permits a deduction for savings, the Income Tax Act[1] imposes a levy on consumption rather than income. Under a pure consumption tax system, however, deferral in respect of retirement savings would not constitute a tax expenditure. In our income tax system, the exclusion from the tax base of certain prescribed types of retirement saving does constitute open tax assistance when compared with other forms of saving which are not deductible.

The tax deferral afforded employees in respect of pension contributions made by their employers is a natural consequence of the 'ability to pay' philosophy. It would be difficult to require individuals to pay current taxes on such non-cash benefits. However, in other cases non-cash benefits are taxable, and it is clear that the policy of fostering retirement saving is a positive, not a negative decision. In its most general terms, the underlying social policy is, presumably, to promote self-sufficiency and well-being following withdrawal from the workforce.

The quantity of tax assistance for retirement saving is not unlimited. For reasons of both fiscal prudence and vertical equity, restrictions are placed on the level of assistance. This includes an absolute maximum on the amount of the annual tax expenditure per individual (maximum benefits in the pension registration rules, RRSP contribution limits, integration of the various retirement savings vehicles) and certain restrictions which, directly or indirectly, limit the total retirement income under tax-assisted plans (maximum pension rules, retirement age requirements). The policy is to restrict the tax expenditure, but not to inhibit any degree of retirement saving through tax disincentives. Thus, the statute is designed to neutralize the impact of income taxation on retirement saving in excess of the levels fostered through tax assistance.

The legislation attempts to distinguish between retirement saving, which fosters self-sufficiency following retirement from the workforce, and salary deferral. It is rather simpler to state the generic distinction than to articulate it in statutory form. While the disappearance of pensions would not immediately yield increased current compensation precisely equal to the current (or present value) cost of pension benefits, nonetheless retirement saving is arguably nothing but a form of deferral of current remuneration, albeit with particular ulterior goals. This conceptual ambivalence is reflected in the complexity and instability of the statutory provisions.

The global policy of fostering retirement saving through tax assistance, within limits, raises questions of horizontal equity. One particular facet of the problem has attracted a great deal of attention. Recent changes will provide a significant degree of integration between personal retirement savings (registered retirement savings plans) and employer sponsored pension plans. While one can quibble with many of the assumptions upon which the new system is based, the overall intent of neutrality is clearly discernible. Fundamentally, however, any social program, whether accomplished through tax expenditure or otherwise, theoretically offends horizontal equity if it is not universal. While this may be appropriate to promote vertical equity, in the case of tax assistance for retirement saving, there is an inherent bias of a regressive nature. The tax expenditure is a kind of matching grant. Within the prescribed limits, employees with more generous employer sponsored pensions receive more tax assistance. This is true with respect to both the absolute level of pension and the quality of the terms and conditions of the plan. The result reflects a conscious government policy to provide incentives for the enrichment of retirement saving. To choose the example of obvious relevance, tax assistance is not reduced in recognition of a plan provision providing for inflation of the pension in pay. In theory, this fosters the negotiation of indexed pensions. We shall return to this subject below.

Unlike legislation expressly designed to regulate pensions, the Income Tax Act does not (and, constitutionally, presumably cannot)[2] overtly prescribe or proscribe behaviour in connection with retirement saving. However, the power of tax-based incentives is great. Some individuals may yet prefer, for example, to save after-tax dollars outside of a registered retirement savings plan to preserve full freedom of investment. There may be employers who prefer to design pension and retirement arrangements without regard to the strictures imposed under the Income Tax Act. But many billions of dollars of Canadian retirement savings are, in fact, held and administered in registered plans which perforce must comply with tax regulatory requirements. In this way, the income tax system adds a further regulatory veneer to the direct requirements of provincial (and, indeed, federal) pension legislation. Nor are all the income tax rules solely or even primarily directed to delineating and controlling tax assistance. The temptation to use the tax registration process as a tool of social engineering has been irresistible. Certain requirements erected by the income tax system exhibit, at best, a patina of tax policy.

III SUMMARY OF INCOME TAX RULES

The federal income tax approach to deferred compensation and retirement saving may be summarized as follows:

a. There is a conceptual distinction between deferral of current compensation and retirement saving.

b. The deferral of current compensation is generally not permitted, subject to numerous exceptions.

c. Deferral implicit in retirement saving is permitted, provided that the inherent tax assistance is limited. That limitation will be expressed (under the pending reforms described below) through a global system of pension registration rules and registered retirement savings plan contribution limits such that the aggregate tax assistance can, in theory, be reflected by the deferral of an annual benefit amount. Compromises and approximations, particularly relating to the difference between RRSPs and registered pensions, and the difference between defined benefit and money purchase plans, will likely create some pressure on the system and lead employees and employers alike to consider their own valuation of benefits as compared to the implicit valuation contained in the system of contribution limits. The behavioural response is yet to be determined.

d. Retirement saving in excess of the amount subject to tax assistance is permitted without limit. In such case, the employee is permitted full deferral of any amount in respect of the implicit benefit, and the employer is subject to a refundable tax intended to equate to non-deductibility.

IV ANALYSIS OF THE CURRENT AND PROPOSED SYSTEM

In this description of the rules relating to retirement saving, we shall take into account amendments made over the past few years, and proposals to be implemented in the near future. Where there remains doubt as to the precise character of proposed rules, this will be noted. Our consideration will follow a logical rather than a chronological progression.

A Salary Deferral Arrangements

A creature of the February 1986 federal budget, the rules respecting salary deferral arrangements are intended to prevent tax deferral on current salaries and wages. Employment income has traditionally been taxed on a cash basis. The doctrine of 'constructive receipt' being relatively undeveloped in Canada[3], the use of bonus accruals and similar techniques led the government to enact a modified accrual system of employee taxation[4].

Essentially, a 'salary deferral arrangement' is a plan, whether funded or not, one of the main purposes for the creation or existence of which is to postpone tax in respect of salary or wages for services rendered in the year.[5] Where the rules apply, the employee's 'deferred amount' (the amount determined at the end of the year that the employee may receive under the plan thereafter)[6] is currently taxable in his or her hands[7], and currently deductible by the employer.[8]

The definition of 'salary deferral arrangement' expressly excludes a number of other compensation arrangements, such as registered pension plans and deferred profit-sharing plans. Also excluded are arrangements under which a taxpayer has a right to receive a bonus or similar payment in respect of services rendered in the year which is to be paid within the following three years. The precise scope of the bonus exemption is not clear. There is a further exemption to preserve 'leave-of-absence' or sabbatical arrangements.[9]

In the context of retirement saving, the relevance of the salary deferral arrangement rules is precisely that they are intended to apply to a deferral of current compensation, and reflect a completely different tax policy than that which grounds the rules applicable to retirement or pension arrangements. Yet, the definition of 'salary deferral arrangement', and the definitions of certain other plans described below, have been carefully framed so as to provide, in effect, an order of priority. For example, salary deferral arrangements are expressly excluded from the ambit of the definition of 'retirement compensation arrangement', suggesting that were it otherwise, there could be an overlap. As remarked previously, the policy line of demarcation between the deferral of current compensation and provision for retirement income is not as clear as their disparate taxation might suggest.

B Employee Benefit Plans

Before the February 1986 budget, the statute expressly countenanced a deferral of current compensation, through the regime of 'employee benefit plans'[10], in essentially the same circumstances in which it is now prohibited, through the regime of 'salary deferral arrangements'. Under the employee benefit plan rules, the employee is not taxed until the amount is received. The employer obtains no deduction until the amount is paid.[11]

The employee benefit plan regime was enacted applicable to the 1980 and subsequent taxation years. The rules were then deemed necessary because of a proliferation of deferred remuneration schemes which apparently involved an inappropriate and potentially costly asymmetry. In fact, the Department of National Revenue had publicly suggested that trusteed benefit plans, often intended to provide retiring allowances or termination payments, could be established on the basis that the employer obtained a current deduction for amounts paid into the plan, while the employee benefitted from deferral until he received amounts out of or under the plan.[12] In many cases, the arrangements openly contemplated deferral of current income, and allowed the employee significant control over the deferred amounts.

The enactment of rules respecting employee benefit plans was intended to re-establish symmetry and, in effect, to reinforce the cash basis of employee taxation. The arrangements contemplated were those under which contributions were made by an employer to a custodian and which provided for payments to be made at a later date to employees or former employees. Where an arrangement was so qualified, employer contributions were not currently deductible, nor currently taxable to the employee. The system was thus designed to ensure that the employee would be taxable only when cash was received out of the plan, and to provide the employer with an appropriate deduction at that time. Complex rules were required to deal with employee contributions and, in particular, income earned by the plan, since these arrangements are not tax exempt.

The rationale for imposing the rules respecting salary deferral arrangements onto the system of employee benefit plans, and thereby virtually reversing the method of taxating deferred remuneration, is to be found mainly in the use to which employee benefit plans were put. While not as beneficial as the non-statutory arrangements in vogue before 1980, employee benefit plans nonetheless presented untoward advantages in some cases. In particular, if the employer was either exempt from tax (hospitals, schools and various institutions) or simply not currently taxable (due to available losses or credits), then any 'penalty' of losing an immediate deduction for the deferred remuneration might be more than offset by the benefit to the employee of deferring taxation.[13] Employee benefit plans came to be quite popular as a means of providing unlimited and unregulated salary deferral for employees of non-taxable employers.

Under the current rules, if an arrangement might qualify under the definitions of both 'employee benefit plan' and 'salary deferral arrangement', the latter provisions apply.[14] This leaves the employee benefit plan rules applicable only to arrangements which would be salary deferral arrangements but for the application of one of the exclusions, or arrangements which are in the nature of retirement saving and do not fit the definition of 'salary deferral arrangement'. As we shall see in a moment, employee benefit plans which are directed to retirement savings rather than deferral of current income have also now been dealt with to prevent the potential abuse by employers not currently taxable.

C Retirement Compensation Arrangements

The use of employee benefit plans by non-taxable employers came to be perceived as an intolerable abuse of the symmetric deferral of both taxation and deductibility which these plans provided. Where the purpose of the arrangement is to postpone tax payable on salary or wages for services rendered in the year, the rules governing salary deferral arrangements now apply. Where, however, the plan is established to provide benefits to be received following retirement, current employee taxation was considered inappropriate. The only alternative method of negating the advantage to non-taxable employer provided by a symmetric deferral is to impose a tax on the employer in lieu of the denial of a deduction. This is the thrust of the recently enacted rules respecting 'retirement compensation arrangements'.[15]

The definition[16] refers to a plan or arrangement under which contributions are made by an employer in connection with benefits which are to be received or enjoyed by any person on, after or in contemplation of any substantial change in the services rendered by that taxpayer or his retirement or loss of office or employment. In the event that there is any overlap between this definition and that of ‘salary deferral arrangement’ (which might arise where a funded retirement compensation arrangement is entered into for the dual purpose of providing retirement income and postponing tax on current remuneration) the salary deferral arrangement rules take precedence.[17] Also excluded from the definition of ‘retirement compensation arrangement’ are various plans otherwise dealt with, including registered pension plans, deferred profit sharing plans, employees profit sharing plans and registered retirement savings plans. The thrust of the definition is to extend the application of the new provisions to so-called ‘non-statutory’ retirement plans, in effect pension or retirement arrangements providing benefits in excess of or as an alternative to those available under registered plans.

Generally, the custodian of a retirement compensation arrangement is required to pay a special refundable tax of 50% on both contributions received from the employer and any earnings under the arrangement. This tax approximates the tax ‘penalty’ to a taxable employer of a denied deduction.[18] Contributions to a retirement compensation arrangement are fully deductible.[19] The taxable employer thus obtains a deduction for contributions to the plan and is subject to a 50% refundable tax. Such an employer is treated essentially as if the amount had not been deductible, which is the rule applicable under the employee benefit plan provisions before the RCA system. A non-taxable employer is placed in much the same position as a taxable employer by the special 50% tax (assuming the corporate tax rate was 50%). The tax is refundable on the distribution of benefits, which are included in computing the income of the employee as retirement income.[20] Effectively, the system is designed so that the refundable tax is indeed refunded when the employee becomes taxable, on a cash basis, on the retirement or pension income.

D Registered Pension Plans and RRSPs

Prior to recent proposed reforms, the link between registered retirement savings plans and registered pension plans was arbitrary, and not very effective. Pension plan members have long had a lower RRSP contribution limit[21], but there has been no quantitative test which takes into account the actual value of employer funded benefits under the pension plan. The rules respecting deductions for pension plan contributions are also somewhat arbitrary. While there is ostensibly a fixed dollar limit on the annual deduction which can be claimed by an employer in respect of a registered pension plan, this cap is effectively undone in the case of defined benefit plans by a potentially unlimited deduction for special contributions in respect of current or past service, where the plan actuary indicates that the arrangement is under-funded.[22] Thus, the real limit on deductibility for contributions to deferred benefit registered pension plans is found in the non-legislative registration rules, which provide for maximum pension benefits and various other conditions for registration.[23]

Commencing with the 1985 federal budget, successive proposals were put forward to rationalize the system and achieve a better balance of tax assistance for overall retirement saving. It soon became apparent that one major difficulty in implementing any such system was complexity. A ‘perfect’ system, which took into account all forms of tax-assisted retirement saving and valued each, could be unworkable in practice. After several tries, the government announced in October, 1986 detailed rules and procedures for an integrated approach to the tax treatment of retirement saving.[24] Part of the administrative complexity was eliminated by providing for calculations to be made by Revenue Canada and furnished to taxpayers. Nonetheless, the proposed system remains rather complicated.

The centrepiece of the reform, which has achieved perhaps more than its share of publicity, is the increase in limits for registered retirement savings plans. The rationale for the increase is simple. On an actuarial basis, one can determine what amount of money would have to be set aside every year by an individual providing for his own pension through a RRSP in order to fund the same maximum allowable pension as permitted under the registration rules applicable to employer pension plans. This exercise has generated the proposed maximum RRSP contribution of $15,500 or 18% of earned income (whichever is lower).[25] There are, naturally, a number of assumptions (including, but not limited to, actuarial assumptions) made in reaching this figure which could be questioned. In addition, there are various intangible benefits of the RRSP system, which, arguably, are not taken into account. For example, RRSPs may be self-administered. The RRSP is, perhaps, the ultimate in a 'portable' plan, more so than pensions regardless of recent improvements in provincial legislation. The funds in an RRSP may be withdrawn at any time: there is generally no lock-in. Notwithstanding the inability to evaluate such benefits, the new rules do at least attempt to establish a basis for a quantitative equivalence of RRSP and employer-sponsored retirement saving.

Indeed, it is the definition of the RRSP 'contribution room' which presents the basis for integration of retirement savings.[26] The potential use of the RRSP by employees as a means of 'topping-up' their retirement funds is substantially enhanced under the new rules. In effect, the aggregate contribution room is intended to encompass all forms of retirement saving. The RRSP contribution itself can be viewed as a kind of residual type of tax assisted saving, the amount of which depends upon the other available forms of assistance. In particular, each employee will be required to reduce his or her total RRSP contribution room by an amount (the 'pension adjustment') which is intended to reflect the annual value of employer pension contributions.[27]

The 'pension adjustment' is equal to the cash amount of contributions to money purchase plans and a formula amount in respect of defined benefit plans. That latter formula is, for obvious reasons, not easy to define. After considerable deliberation, the government has chosen to calculate the pension adjustment for a defined benefit plan as an amount equal to nine times the 'benefit entitlement', minus $600. The $600 figure is an ad hoc adjustment, supposedly intended to reflect the fact that not all plans provide the same level of ancillary benefits (and, co-incidentally, to provide an appropriate de minimus contribution to all members of pension plans as promised in previous budgets). The key in valuing the defined benefit plan is the calculation of the 'benefit entitlement'. This will be determined in accordance with regulations yet to be promulgated (a draft is expected imminently). In the case of certain types of plans, it will likely by quite complicated. Generally, however, the thrust of the benefit entitlement definition can be discerned from its application to a simple plan. Where the plan has a single benefit rate and no integration with Canada Pension Plan or Old Age Security, the benefit entitlement equals the benefit rate applied to the employee's pensionable earnings. The maximum benefit rate permitted under the existing administrative registration requirements[28] is 2%. Nine times 2% is 18%, the same figure which is used in determining maximum RRSP contributions. If one multiplies by the maximum pensionable earnings (to yield the maximum permitted pension) one should find that nine times the benefit entitlement equals the maximum RRSP contribution limit, leaving every employee with a permitted $600 RRSP contribution. As the benefit rate reduces, the permitted RRSP contribution increases, thereby allowing for 'topping-up' at the individual level.

There are many other aspects of the new proposed rules which are important in assessing its full impact, but perhaps beyond the scope of these remarks. The limited carryforward of RRSP contribution room provides some rough equivalence with pension plans which, after all, can be funded after the fact. Complex provisions apply where there are refunds of pension benefits which have vested, or where there is a forfeiture of pension benefits which have not vested. Generally, such rules do attempt to take account of vesting requirements in federal and provincial pension legislation.

One aspect of the new rules, the details of which have not yet been made public, is the codification of existing administrative provisions relating to registration. One key element in the new system is that there will be no annual limit on the deduction of required employer or employee pension contributions.[29] This places additional pressure on the registration system (although the pressure was perhaps already there in light of the permissive rules respecting 'special' contributions). The existing Information Circular grapples, to some extent, with the difficult problem of ancillary benefits, and the definition of benefits generally.[30] The new codification rules will likely go into further detail, in order to permit the Registration Division of the Department of National Revenue to force plans into compliance as a condition precedent for registration. The critical point is that limiting tax assistance to registered pension plans (and, through the new integration system, to RRSPs as well) is only effective if the plans cannot get around the limitations through beneficial terms and conditions. For example, a definition of pensionable earnings which includes a multiple of actual earnings in certain circumstances would effectively circumvent the limitation on tax assistance. Leave of absence provisions create difficulty, as can maternity leave or any other provisions which permit an employee to accumulate pension benefits when not actually working. Retirement age has always been a matter dealt with by administrative fiat. now likely to be codified.

Overall, it can readily be perceived that the formulation of such registration rules, particularly in a legislative code, requires numerous decisions which, though ostensibly intended to limit or delineate the amount of tax assistance, in fact mold the contours of pension plans. For to the extent that registration is a practical sine qua non of establishing a pension plan, compliance with registration rules becomes effectively just as important as compliance with applicable pension legislation. It would be surprising if there were not friction between the two systems. Pension legislation, as a general rule, seeks to promote greater benefits for employees, and would not normally circumscribe or limit benefits. The income tax registration rules, on the other hand, must reflect hard choices regarding circumscription of benefits.

Generally, those choices can be made in one of two ways. First, a particular stipulation of the pension plan may be prohibited or specifically limited (e.g. maternity leave). This approach will be taken in respect of many plan provisions, and indeed is already reflected in some cases in the Information Circular. Alternatively, the income tax rules can permit ancillary benefits but seek to value them, and take this value into account in determining RRSP contribution room. In the rules for determining the pension adjustment, no adjustment is to be provided for variations in most ancillary benefits. The system is already complicated enough. Any attempt to value such ancillary benefits would likely be unadministrable. Thus, certain types of ancillary benefits (unless they are prohibited) are treated as so-called 'non-taxable upgrades'. That is to say, these benefits are permitted, and not taken into account in valuing the plan, thereby providing a kind of indirect incentive to employees to bargain for them.

The government has expressly indicated certain ancillary benefits which will be treated as non-taxable upgrades, including early retirement, bridging benefits prior to receipt of Canada Pension Plan, survivor's benefits, benefit guarantee periods, disability benefits, pre-retirement death benefits and, of particular relevance in this context, indexing of pension in pay.[31]

V THE CONSEQUENCES

The Task Force is considering recommendations regarding inflation protection in pension plans governed by Ontario law. A related issue is the treatment of plan surplus. The income tax rules regarding retirement saving, and particularly the recent and proposed reforms relating to registered pension plans, represent part of the context in which any Task Force recommendations will be made.

A The Income Tax Regime

The foregoing discussion has elaborated to some extent on the summary of income tax rules which preceded it. Pension plans should fall squarely into the category of retirement saving, as opposed to salary deferral. The attitude of the federal government as regards tax deferral is that it is probably not permissible in respect of arrangements designed to postpone the receipt of current remuneration. It is permitted with respect to retirement saving, but within limits, and subject to various strictures. While the main rationale for such restrictions is to impose control over the implicit tax expenditure, and to force upon that expenditure some measure of horizontal and vertical equity, the rules necessarily impinge upon the regulation of pension plans.

In particular, those concerned with pension reform must recall that in order to be registered, the plan must comply with administrative requirements of Revenue Canada, Taxation as well as the proposed codification and extension of those requirements. A plan may not be registrable because it fails to comply with these requirements, and in addition, many so-called 'top-up' plans, intended to provide additional retirement income beyond that permitted under these requirements, are not registered. Employee contributions to non-registered plans are not deductible. Under the retirement compensation arrangement rules, employer contributions are not deductible but are subject to a countervailing tax. In effect, employee contributions are made, and returned, outside the tax system. Such employer contributions are not 'tax effective'. Ontario legislation must be viewed alongside federal tax rules. Any attempt by Ontario to require provisions in a pension plan which would render the plan unregistrable would create a significant and explosive conflict.

B Inflation Adjustment

The particular issue of most interest to the task force is, of course, indexing. The Information Circular currently applicable to registered pension plans generally permits provisions for supplementary pensions in recognition of increases in the cost of living after retirement.[32] Such supplementary pensions may be adjusted on a quarterly or less frequently basis, and the adjustments may be linked to various measures of cost of living, for example, investment performance of the fund, but in such case the adjustments must be warranted by increases in the Consumer Price Index. The current proposals for reform of the pension system do expressly refer to any regulation of indexing, and suggest that no restrictions whatsoever will be imposed.

If this approach is enacted, there should be no friction between any indexation policy adopted by the government of Ontario and the federal registration rules. Whatever mandatory indexation may be imposed upon plans, it will not have an adverse income tax result: such a stipulation will not prevent registration of the plan and will not limit RRSP contribution room. On the other hand, the generosity of the tax registration rules is such that there could still be an incentive for employees to bargain for better indexing provisions than whatever is mandated by the government of the Province.

C Plan Surplus

Surplus in a pension plan may arise because of changes in the workforce, forecasting errors, the conservatism of actuarial and financial assumptions, or as a natural consequence of investment activity and economic conditions. In theory, such a surplus presents the tax authorities merely with a 'timing problem'. Deductible contributions by the employer are reduced or eliminated while the surplus persists and, in the long run, the appropriate result should obtain. As well, from a tax perspective, the withdrawal of surplus for the benefit of either the employer or the employee presents no particular difficulty.

From a fiscal standpoint, substantial plan surpluses do present a problem. They represent untaxed accumulations of wealth. Further, the current income on such untaxed accumulations also escapes tax due to the exemption accorded pension plans. Indeed, the potential tax savings could constitute a motivation for tax avoidance, particularly in the case of pension plans established by closely-held corporations. Where a significant shareholder is a beneficiary of the plan, such a surplus represents a potential avoidance of the aggregate limitations on retirement saving through pensions and registered retirement savings plans.[33]

Here then is a source of potential tension between income tax authorities on the one hand and pension plan regulators on the other. The regulators may wish to require that plan surplus not be distributed, that it be applied to increase benefits or dealt with in some specific manner. From an income tax perspective, there may be reason to place ceilings upon the plan surplus which can be accommodated in registered form.

Under the existing administrative provisions, there is no restriction on the accumulation of surplus. As previously noted, the statute permits 'special' contributions as required by the plan actuary. There are, however, restrictions regarding the use of surplus. In determining the maximum pension payable to employees, all pension benefits, including any distribution of surplus, is taken into account.[34] Furthermore, a defined benefit plan, in order to be registrable, must not permit the distribution to a member upon termination of the plan or at any other time of any portion of the surplus if that would result in excessive benefits, beyond those permitted. The plan must therefore contain a provision permitting the actuarial surplus to be refunded to contributing employers upon termination of the plan.[35]

There has been some discussion among officials in the Department of Finance of requiring distribution of surplus exceeding some specified percentage of plan requirements, or under some other formula. However, it is unlikely that the federal authorities will wish to engage themselves in the debate about current entitlement to surplus at this time. There was no reference to this issue in the 1986 discussion paper on retirement savings. It is probable that the matter will not be dealt with in the proposed codification of registration rules, or at least not immediately.

D The Future of Defined Benefit Plans

One potential effect of the new rules may be a disincentive to establish defined benefit plans. I am not qualified to comment upon this prediction. There may well be other more important built-in disincentives to the establishment of defined benefit plans (in particular, minimum employer funding requirements and the treatment of plan surplus). Certainly the complexity of the new rules, reporting requirements and potential communications problems are likely to be relevant factors.

The more finely-tuned retirement saving tax regime, whether or not it will actually discourage the creation or continuance of defined benefit pension plans, will almost certainly lead to their close examination. Now that a statutory basis for comparing defined benefit and money purchase plans will be available, employees and employers may wish to consider whether the valuation of benefits for income tax purposes reflects what they regard as a fair equivalent to the money purchase alternative. For example, if employees determine that the reduction in their RRSP contribution room effected by the 'pension adjustment' arising out of their defined benefit plan exceeds what they deem to be the real value of the annual increments in that plan, they may seek to pressure their employer to alter ancillary benefits, convert to a money purchase plan, or provide 'opting out' provisions which would enable them to use the registered retirement savings plan alternative. One obvious difficulty in making this comparison will relate to the less tangible advantages of the defined benefit plan, including indexing.

NOTES

1. RSC 1952, C.148 as amended. Section references herein are to the Income Tax Act. This paper is based upon the provision of the statute as of December 31, 1987.

2. Direct regulation of employment outside works falling within federal legislative jurisdiction could likely be impugned under the rule established in Toronto Electric Commissioners v. Snider, [1925] AC 396. It is less clear how general regulation of retirement saving might fare.

3. See the brief discussion in Broley, 'Deferred Compensation and the Accrual Interest Rules', 1985 Corporate Management Tax Conference (Canadian Tax Foundation) p. 52 at pp. 52-5.

4. See, for example, R.K. McDermott, 'Current Planning for Fringe Benefits, Employee Benefit Plans, and Employee Trusts and Withholding Requirements', 1981 Conference Report (Canadian Tax Foundation) p. 849 at pp. 850 ff.

5. Defined in subsection 248(1).

6. Defined in subsection 248(1).

7. Subsections 6(11) to (14).

8. Paragraphs 18(1)(o.1) and 20(1)(oo).

9. Draft regulations, (proposed section 6801 of the Income Tax Regulations), April 6, 1987.

10. Defined in subsection 248(1).

11. These provisions still apply, but in a restricted class of cases due to the overriding salary deferral arrangement rules: subparagraph 6(1)(a)(ii), paragraph 18(1)(o), subsection 18(10) and section 32.1.

12. D.H.L. Davidson, 'Executive and Employee Compensation: A Perspective from Revenue Canada', 1979 Corporate Management Tax Conference (Canadian Tax Foundation) p. 238 at p. 239.

13. The issue is expressed by the Department of Finance in Technical Notes released with proposed legislation dealing with retirement compensation arrangements, March 27, 1987.

14. Due to paragraph (c.1) of the definition of 'employee benefit plan' in subsection 248(1).

15. Enacted by Bill C-64, Royal Assent December 17, 1987.

16. In subsection 248(1).

17. Due to paragraph (k) of the definition.

18. Part XI.3. The 50% rate was a more accurate surrogate for non-deductibility before tax reform in 1987 lowered the general corporate income tax rate.

19. Paragraph 20(1)(r).

20. Paragraphs 56(1)(x) to (z).

21. Paragraph 146(5)(a).

22. Paragraph 10(1)(q) and (s).

23. Information Circular 72-13R7: Employee's Pension Plans, dated December 31, 1981.

24. 'Saving for Retirement', Department of Finance, Ottawa, October, 1986 (released October 9, 1986). A Notice of Ways and Means Motion to Amend the Income Tax Act is appended to that document.

25. Notice of Ways and Means Motion, supra note 24, clause (2). The current limit is $7,500. The proposal calls for a phasing in of the higher limit by 1991. The schedule has been modified in the past, and could be modified further.

26. Ibid.

27. To be prescribed by regulation. The following description is based primarily on pp. 12-24 of the paper 'Saving for Retirement', supra note 24.

28. Information Circular 72-13R7, supra note 23, subparagraph 9(g)(i).

29. Notice of Ways and Means Motion, supra note 24, para. (4) and (5). Additional voluntary contributions are to be prohibited: para. (7), subject to revised transitional relief.

30. Supra note 23, sections 8, 9 and 10.

31. 'Saving for Retirement', supra note 24, page 15.

32. Information Circular 72-13R7, supra note 23, para. 9(i).

33. The ability of significant shareholders to participate in pension plans is somewhat restricted. For many years, so-called 'top hat' pension plans were not registrable. In 1980, rules were promulgated under which, subject to certain restrictions, pension plans for the benefit of shareholders and other employees could be registered. These supplementary rules regarding shareholder pension plans, as modified, were republished and circulated by Revenue Canada in the form of an open letter dated March 25, 1987.

34. Information Circular 72-13R7, supra note 23, para. 9(g)(i).

35. Ibid, section 13.1.

The Impact of Tax Regulations on the Design of Inflation Protection

Nicholas J.M. Simmons

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The Impact of Tax Regulations on the Design of Inflation Protection

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I INTRODUCTION

The regulation of private pension plans in Canada falls under provincial jurisdiction except where plans are sponsored by federally regulated employers such as banks, airlines, etc. There is, however, a second layer of regulation imposed under the federal Income Tax Act.

This income tax regulation does not overtly force employers to include specific provisions in their plans. Nor are there provisions that are specifically forbidden. The Income Tax Act does insist that plans meet a variety of requirements set out in the law, regulations and administrative rules as a condition for extending the substantial benefits of registration under the Income Tax Act. A plan registered under the Income Tax Act entitles the employer and the employee to an immediate deduction for contributions and does not tax the benefits until they are paid. In the meantime, investment income is accumulated on a tax deferred basis.

Robert Couzin of the legal firm Stikeman, Elliott has prepared a paper entitled 'Income Taxation and Retirement Savings'. That paper outlines many of the areas where Income Tax rules impinge upon retirement savings and pension plans. The purpose of this current paper is to analyze the effect of the various rules and regulations, cited in Mr. Couzin's paper, on pension plans and on the design of inflation protection in particular.

In order to do this most effectively, I have selected the following broad areas where the Income Tax rules may be expected to have a significant impact on the work of the Task Force and have organized my comments accordingly.

1. Choosing between pension plans and other forms of retirement saving;
2. Implications of the proposed Pension Adjustment calculation;
3. Implications of the proposed Pension Adjustment Reversal calculation;

4. Funding for inflation protection;
5. Excess Benefits;
6. Pension Plan Surpluses.

II CHOOSING BETWEEN PENSION PLANS AND OTHER FORMS OF RETIREMENT SAVING

Changes recently proposed for the tax treatment of retirement savings arrangements will provide a significant degree of integration between personal Registered Retirement Savings Plans and Employer-Sponsored Pension Plans. As part of the same package of tax changes, the contributions that can be made to RRSPs by persons who are not members of employer-sponsored plans will be significantly increased. This is especially true for middle and upper income earners.

All of this means that, for the first time, RRSPs are becoming a credible alternative to registered pension plans for many employers.

The Task Force has to consider carefully the relative advantages to employers and employees of these two alternative retirement saving mechanisms so as to ensure that its goal of making inflation protection widely available to pension plan members is not negated by a shift of emphasis to unindexed RRSPs and Deferred Profit Sharing Plans (DPSPs).

The federal Department of Finance claims merely to have restored a financial balance between money purchase plans - such as RRSPs and DPSPs - and defined benefit pension plans. Some experts, however, contend that the rules actually favour the money purchase approach on a purely financial basis, especially for younger, more mobile employees. In practice the major factors governing the relative financial attractiveness of the two approaches are the expected rates of investment return and salary increase.

Whatever the merits of the financial comparison, most employees seem to consider that RRSPs have considerable intangible advantages. These include:

- the ability to direct the funds as the employee-owner sees fit including a self-administered approach;
- full portability from one plan to another and the ability to continue the plan when changing jobs;

- the ability to collapse the plan at any time, subject to a tax penalty;
- the absence of a lock-in provision to force pension plan members to take their pensions as life annuities;
- the availability of the registered retirement income fund (RRIF) option at retirement.

The common theme running through these employee preferences is flexibility. Employees usually want to control and have choices over investment of contributions, and payout of their retirement savings arrangements. In particular, many employees stress the attraction of being able to withdraw funds before retirement and of being able to receive a lump sum payment or enhanced payments in the early years of retirement.

In fact most RRSP owners would be likely to oppose any suggestion that they take their payout as an indexed annuity because it runs counter to their desire for flexibility and because it reduces their benefits in their early years of retirement. Most likely view the cost of an indexed annuity as being unacceptably high especially given that they might well have to live some 15 years after retirement before receiving the same value of benefits as they would have received under a level annuity. The lack of public interest in various indexed annuity products marketed to date bears this out.

Employers, too, are increasingly finding RRSPs a credible retirement savings alternative. In large part, this is a response to the employee perceptions noted above. However, there are many other employer issues. These include:

- simplicity of administration and communication;
- freedom from onerous restrictions of pension reform legislation;
- freedom from surplus ownership concerns;
- perception of fixed, determinable cost.

The group RRSP approach was developed in response to these employee and employer objectives.

It should also be noted that many employers who are joining the trend away from defined benefit pension plans towards money purchase arrangements and especially RRSPs and DPSPs are doing so despite the fact they believe the defined benefit approach can do the best job of providing for the employees' needs.

The driving force seems to be a reluctance to continue telling employees 'we know what is best for you' and disenchantment with what they see as increasing government interference in registered plans and, in some industry sectors, a fear that the increased costs of pension reform will make the employer uncompetitive.

To summarize, other retirement savings vehicles such as RRSPs and DPSPs will, with the federal tax changes, become a credible financial alternative to registered pension plans.

It seems they may be preferred by many employees and employers for a variety of non-financial reasons. On financial grounds there is arguably a balance between the two approaches with their relative attractiveness depending on the economic assumptions used.

The Task Force needs to consider what impact its recommendations may have on this balance and whether there is any danger that the Task Force's reccommendation might simply increase the trend away from registered pension plans towards unindexed alternatives.

III IMPLICATIONS OF THE PROPOSED PENSION ADJUSTMENT CALCULATION

As already discussed, the recent federal tax changes seek to integrate personal RRSP savings with employer-sponsored pension arrangements. This is achieved by calculating a deemed value for any defined benefit pension earned under an employer-sponsored plan.

This deemed value is referred to as a Pension Adjustment or P.A. and is used to adjust downwards the amount of RRSP contributions a pension plan member would otherwise be allowed to make.

The P.A. is calculated as:

9 x 'Benefit Entitlement' - $600

Here, the Benefit Entitlement is simply determined from the benefit formula of the plan using the current year's earnings. No account is taken of various ancillary provisions such as early retirement options, bridging benefits, spouse pensions or, probably of more immediate interest, indexing. That is, the PA calculated for an indexed 2% pension benefit would be exactly the same as that for an unindexed 2% pension benefit. The indexing feature is assigned a zero value for the purpose of determining the allowable RRSP contribution.

The Task Force needs to consider the ways a pension plan's benefits might be changed in response to this calculation method's apparent overvaluation of unindexed pensions. By doing this the Task Force can determine whether the Federal Government's tax changes support the province's goal of increasing the availability of indexing.

Four scenarios can be used to illustrate possible types of response. In each case, it will be assumed the starting point is a 2% non-contributory final earnings plan.

A Reduce Benefit

The 2% unindexed benefit could be changed to an indexed benefit of between 1.25% and 1.5% chosen to maintain the same level of employer cost. The P.A. calculation would now result in a lower deemed value and increased RRSP savings opportunities for employees.

The Province's goal of extending indexing would have been assisted though the level of pension would have been reduced which might not be a desired outcome.

B Contributory Benefit

The 2% unindexed benefit could become a 2% indexed benefit with employees now required to contribute 4% or 5% of salary to the plan to defray the cost of indexing.

The goal of extending indexing would have been met and pension levels would not have been cut back.

C Unchanged Benefit

The benefit could remain unchanged and unindexed. There would be little RRSP room available to employees.

There would not have been any progress towards policy goals.

D Money Purchase

In reaction to the apparent overvaluation of the unindexed benefit for tax purposes, the plan could be discontinued in favour of a money purchase approach whether through an RRSP or DPSP or through a pension plan.

Assuming that RRSPs and DPSPs remain unindexed, no progress will have been made towards policy goals.

The choice as to which, if any, of these alternatives was preferred by a particular plan sponsor and plan member group would be based on an analysis of the employer and employee needs and objectives. While it might, at first sight, seem that either alternative (a) or alternative (b) would commonly be selected due to the better potential combination of RRSP and pension opportunities, there would likely be considerable employee concern about either a reduced starting pension or an increased contribution requirement.

Even under the existing structure most employees may feel that there is adequate RRSP contribution potential. This will depend on the particular plan features, such as integration with the Canada Pension Plan as well as on the members' general level of interest in retirement saving. It is quite possible therefore that many groups would decide to stay with the status quo - that is alternative (c).

On the other hand, total discontinuance of the pension plan as under alternative (d) could be quite attractive for many groups especially if the employer or the plan members were predisposed towards a money purchase approach for the reasons discussed under heading 1 above.

IV IMPLICATIONS OF THE PROPOSED PENSION ADJUSTMENT REVERSAL CALCULATION

Part of the recently announced package of reforms to the tax treatment of retirement savings was a Pension Adjustment Reversal calculation (PAR). The PAR essentially corrects the overvaluation usually present in the PA calculation. It is required whenever a terminating employee leaves and takes a transfer to an RRSP in complete satisfaction of his benefit entitlement.

The calculation takes the lump sum benefit transferred and allocates part of it to a seven year carry forward period. The PAR is the excess of (a) the PAs actually charged in the carry forward period over (b) the part of the lump sum payment allocated to the carry foward period. It is therefore a measure of the overvaluation of benefits for PA purposes during the carry forward period and it is used to create additional RRSP contribution space.

There are three likely consequences which the Task Force should consider to determine their effect on provincial indexing initiatives.

(a) Almost all terminating employees will choose to take lump sum transfers in satisfaction of their pension rights. This will allow them to utilize the potential additional RRSP contributions created by the PAR calculation. It will therefore likely mean there will be very few deferred vested pensions in the future.

(b) Current tax rules even allow the fair market value of the pension to be transferred to an RRSP at retirement. This could become more widely used, especially if members see it as a way of obtaining a larger, unindexed pension in place of the indexed pension provided under a pension plan.

(c) PARs will often be very substantial. Many mobile lower paid employees will soon have so much RRSP contribution room available to them that subsequent PA calculations will become irrelevent.

The Task Force will need to consider the implications of these preferences. For example will the substantial use of lump sum transfers mean that the Task Force does not need to concern itself with inflation protection for deferred vested pensions? Are controls needed to avoid lump sum payments being used to circumvent the indexing requirement?

V FUNDING FOR INFLATION PROTECTION

Federal tax rules do currently allow employers to make advance provision for inflation protection up to the level of the consumer price index.

In practice, this facility has rarely been used because few pension plans have provided contractual inflation protection and, in the absence of a contractual liability, Revenue Canada has refused to allow funding. Many plan sponsors have nonetheless made advance provision for ad hoc benefit improvements by using more conservative actuarial assumptions than they otherwise would have entertained. This has tended to create plan surpluses which have been used to provide for the cost of the ad hoc increases.

If inflation protection is mandated, it should be prefunded. If it is not, intolerable burdens will be passed on to future generations. Some employers may be concerned that Pension Commission Guidelines force them to overprovide for the cost of indexing. This concern would stem from the experience of the past several years where the assumptions the Commission has been prepared to accept have been much more conservative than the admittedly unprecedented and almost certainly temporary, actual experience. At the same time, over-contributions have usually not been recoverable due to the attitude being taken by the courts.

VI EXCESS BENEFITS

Revenue Canda places a limit on the amount of pension that can be paid from a pension plan that is registered for tax purposes. This limit is currently the lesser of 2% of the best consecutive 36 months average earnings or $1,715, multiplied by the number of years of pensionable service to a maximum of 35 years.

In practice, for a full career, the maximum pension is 70% of average earnings or $60,000 per year. These limits have been in place since 1976 and are not to be changed until 1995 by which time it is anticipated they will restrict the pensions of persons earning in excess of 2 1/2 times the average industrial wage.

Many companies attempt to compensate their senior employees for these 'excess beneifts' either through unfunded contractual arrangements or through Employee Benefit Plan trusts. To date, the province has not attempted to register or control the funding or provisions of such 'excess benefit' arrangements. This may change. In particular, indexing provisions might be extended to excess benefits.

If the province were to force the funding of excess benefits under the rather sweeping powers of the new Pension Benefits Acts, the arrangements would, for tax purposes, become Retirement Compensation Arrangements or RCAs.

As described in the Stikeman, Elliott paper, RCAs are subject to a 50% refundable tax which was thought to be roughly equivalent to corporate marginal tax rates. The cost of providing benefits through an RCA was then comparable to the cost of providing for the same benefit on an unfunded basis since any internal book reserve established by the employer would also have been done on an after tax basis.

With the tax reform initiative of June 18, corporate marginal tax rates will be significantly reduced. The Department of Finance intends to keep the refundable RCA tax at 50%. This significantly distorts the balance between funded and unfunded benefit costs, making unfunded arrangements significantly cheaper in most cases. The same comparison applies for indexing costs.

VII PENSION PLAN SURPLUSES

The accumulation of pension surpluses is strongly opposed by Revenue Canada. The tax assistance granted to defined benefit pension plans is limited by various 'maximum benefits rules'. Allowing continued favorable tax treatment for surplus funds could appear to extend tax assistance to surplus amounts beyond the maximum benefit rules. Most likely, Revenue Canada is also concerned that surplus funds might be allowed to build up without their being committed to provide benefits to plan members with the possibility of some unauthorized corporate tax deferral.

Generally speaking, therefore, employer past service pension contributions (to fund deficiencies or to pay for increased benefits) are not allowed when there are any surplus funds. Employer current service contributions, that is, amounts received to fund the ongoing pension accrual for service, are not allowed if surplus exceeds the expected employer contributions for the next 24 months. Any amount over this 24 month cost margin must be used to reduce employer contributions or must be withdrawn.

There is clearly a conflict between Revenue Canada's pressure that surpluses be withdrawn or used to reduce employer costs and various current provincial initiatives to place moratoria on surplus withdrawals. It is doubly ironic that the wording in many pension trust agreements concerning the irrevocable nature of contributions, which is now causing such problems for sponsors contemplating surplus withdrawal, was put in at the direct insistence of Revenue Canada in the 1960s.

The Task Force should bear these Revenue Canada requirements in mind when deciding whether surpluses and indexing have any connection. The Task Force should also consider to what extent, if any, the uncertainty and concern of plan sponsors regarding surplus ownership would inhibit them from voluntarily or consciously allowing surpluses to develop in the future even in the absence of Revenue Canda restrictions.

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